

**BENS/BENY**  
*Operation Guide*

*Barudan*

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# Chapter 1

## Overview

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## Introduction

This manual covers the operation and maintenance of your BENS embroidery machine. We urge you to read the entire manual before operating the machine. Even if you have arranged for instruction, read this manual first to make the most effective use of your instruction time. Thorough knowledge of the contents of this manual is essential for the proper operation and long life of the machine.

You will learn about the machine features and options, basic operation, advanced sewing features, pattern utilities, and how to connect and use peripheral devices.

This manual is divided into the following chapters:

<b>Overview</b>	Basic information about the BENS and how the manual is organized and connecting peripheral devices.
<b>Memory Operations</b>	Information on reading patterns into machine memory, working with patterns in machine memory and on floppy disk.
<b>Sewing</b>	Instructions on sewing, floating, changing the color sequence in a pattern, and setting the machine sewing parameters.
<b>Error Codes</b>	A list of machine error codes, and display prompts.

Throughout the manual, important information will be emphasized as a Note, Caution, or Warning.

<b>NOTE:</b>	<b>Helpful information about operating the machine.</b>
<b>CAUTION!</b>	<b>Important information about protecting the machine.</b>
<b>WARNING!!</b>	<b>Safety information about protecting yourself.</b>

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## Important Safety Instructions

When using an embroidery machine, basic safety precautions should always be followed. This machine is intended for commercial use.

Read all instructions before using this machine.

Save these instructions.

## **Danger**

To reduce the risk of electric shock:

- An embroidery machine should never be left unattended when plugged in. Always unplug this embroidery machine from the electric outlet immediately after using and before cleaning.

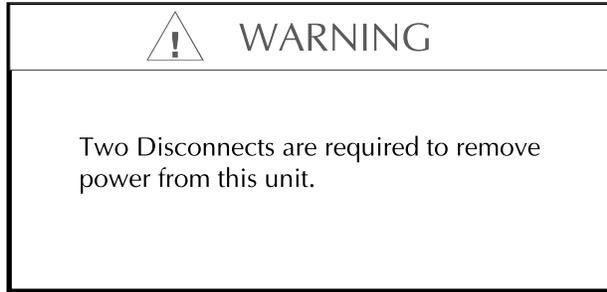
## **Warning**

To reduce the risk of burns, fire, electric shock, or injury to persons:

- Do not allow to be used as a toy. Close attention is necessary when this embroidery machine is used by, or near, children.
- Use this embroidery machine only for its intended use as described in this manual.
- Use only attachments recommended by the manufacturer, as contained in this manual.
- Never operate this embroidery machine if it has a damaged cord or plug, if it is not working properly, if it has been damaged or is wet. Contact your distributor for repairs or service by an authorized, qualified technician.
- Never operate the embroidery machine with any air openings blocked. Keep ventilation openings of the machine free from the accumulation of lint, dust, and loose cloth.
- Never drop or insert any object into any opening.
- Do not use outdoors.
- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
- To disconnect, turn all controls to the off position, then remove the plug from the outlet.
- Do not unplug by pulling on the cord. To unplug, grasp the plug, not the cord.
- Keep fingers away from all moving parts. Special care is required around the sewing machine needles.
- Always use the proper needle plate. The wrong plate can cause the needle to break.
- Do not use bent needles.
- Do not pull or push fabric while stitching. It may deflect the needle, causing it to break.
- Switch the sewing machine off when making any adjustments in the needle area, such as threading the needle, changing a needle, replacing the bobbin, changing the presser foot, or the like.

- Always unplug the machine from the electrical outlet when removing covers, lubricating or when making any other user servicing adjustments mentioned in the instruction manual.
- Connect this embroidery machine to a properly grounded outlet only. See Grounding Instructions.
- Always unplug before relamping. Replace bulb with same type rated Watts.
- Keep fingers away from moving parts, especially the area near trimmer blades.

### **Warning Labels Attached to the Machine**



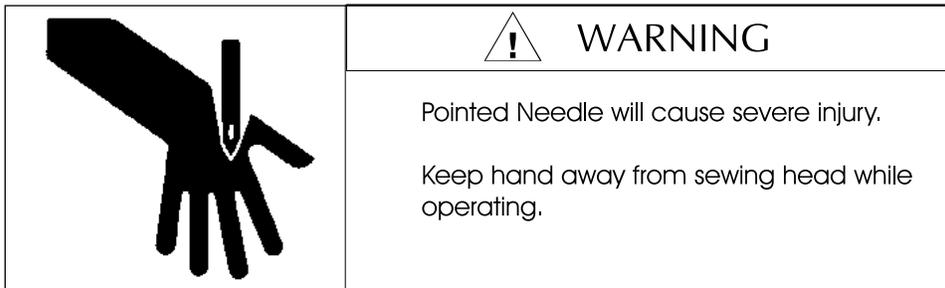
Disconnect Warning Label

## SAFETY INSTRUCTIONS

When using an embroidery machine, basic safety precautions should always be followed.

To reduce the risk of burns, fire, electric shock, or injury, please read and understand the following instructions before using this machine.

1. Use this embroidery machine only for its intended use as described in the instruction manual.
2. This machine must be grounded.
3. Keep long hair, necklaces, and bracelets away from the machine while operating.
4. Switch the sewing machine off when making any adjustments in the needle area, such as threading the needle, changing a needle, replacing the bobbin, or the like.
5. Keep fingers away from moving parts, such as the needle, hook, take up lever, frame, thread trimmer, shaft, pulley belt and gear.
6. Do not operate the machine without the protective covers for the shaft, pulley, belt, and gear in place.
7. Always unplug the machine from the electrical outlet when lubricating, cleaning or when making any other adjustments.
8. Always turn off the power and wait for one minute before opening the electrical box or changing the board in the box.
9. Never operate this embroidery machine if it has a damaged cord or plug, if it is not working properly, if it has been damaged or is wet. Contact your distributor for repairs or service by an authorized qualified technician.
10. Use only attachments and parts recommended by Barudan. When using an embroidery machine, basic safety precautions should always be followed.



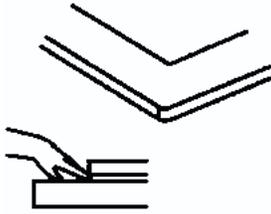
Needle Warning Label

	 <b>WARNING</b>
	<p>Keep Cover Closed.</p> <p>Moving part can catch hair, finger, hand or clothes and will cause severe injury. Turn off power before servicing machine.</p>

Hair Hazard Warning Label

	 <b>WARNING</b>
	<p>Moving part can cause injury.</p> <p>Keep hand away from sewing head while operating.</p>

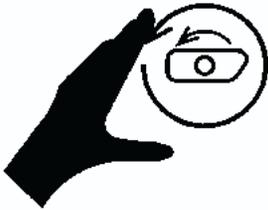
Take-Up Lever Warning Label

	 <b>WARNING</b>
	<p>Moving frame can cause severe injury.</p> <p>Keep hand away from tabletop while operating.</p>

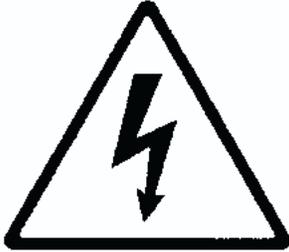
Frame Warning Label

	 <b>WARNING</b>
	<p>Keep Cover Closed.</p> <p>Nip point will catch hair, finger, hand or clothes, and will cause severe injury. Turn off power before servicing machine.</p>

Belt Warning Label

	 <b>WARNING</b>
	<p>Rotating hook can cause severe injury.</p> <p>Keep hand away from rotating hook while operating.</p>

Hook Warning Label

	 <b>WARNING</b>
	<p>High Voltage.</p> <p>Disconnect from voltage source before servicing. Can cause serious injury or death.</p>

High Voltage Warning Label

 <b>NOTICE</b>	 <b>AVISO</b>
<p>TO PROLONG THE LIFE OF THE FLOPPY DRIVE REMOVE DISC WHEN NOT IN USE</p>	<p>PARA PROLONGAR LA VIDA DE LA DISQUETERA- SAQUE EL DISCO CUANDO NO ESTE EN USO</p>

Floppy Warning Label

 CAUTION

This product has more than one connection to the source of supply. To reduce the risk of electrical shock, disconnect all such connections before servicing.

Shock Warning Label

## Environmental Specifications

Temperature: 5 to 40 degrees centigrade (Operational)  
-10 to 60 degrees centigrade (Storage)  
Humidity: 45 to 85%RH without condensation

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## BENS Features

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<b>Icon Menus</b>	The LCD display uses easily recognizable icons for machine commands.
<b>Pattern Memory</b>	The BENS internal memory holds 261,000 stitches, expandable to 696,000 stitches. There are 10 locations in which to store patterns.
<b>Memory Backup</b>	A lithium battery saves machine pattern memory in case of power failure, or when the power is turned off. A backup disk of all patterns stored in memory can easily be created with one command.
<b>Pattern Programming</b>	Change the pattern size, orientation or repeat.
<b>Add/Merge Patterns</b>	Create a new pattern by combining patterns, or repeating a single pattern with control over the space between the repetitions.
<b>Saving Patterns</b>	Save an edited pattern on floppy disk or paper tape.
<b>Soft Limits</b>	Set soft field limits from within the machine software that protect the machine by preventing the hoop or pantograph from running into the needle.
<b>Software Updates</b>	Machine software is now easily updated from floppy disk, eliminating the need to change ROMs.
<b>Teach</b>	Easily locates and changes existing function codes in the pattern. Lets you insert new codes in the pattern.
<b>Float</b>	Moves the pantograph through the pattern without sewing.
<b>Perimeter Trace</b>	Quickly verifies the pattern size before sewing, preventing the needle from running into the hoop and damaging the machine.
<b>Automatic Thread Trimmer</b>	Trims the top and bottom threads. Programmable to trim on long jump stitches, color changes, or trimming signals contained in the pattern.

<b>Automatic Speed Change</b>	Adjusts the sewing speed according to stitch length for the best sewing quality.
<b>Origin</b>	Automatically seeks the design origin position, to allow proper repositioning of the pantograph if it is accidentally moved while the power is off.
<b>Standby</b>	Recovers the pantograph position if power fails while the machine is sewing.
<b>Automend</b>	Backs up a single head, to repair missed stitches. After sewing is resumed and the missing stitches are filled in, the remaining heads resume sewing.
<b>Stitchback</b>	Reverses the pantograph to repair missed stitches, letting you back up to the required point. All heads sew from the backup point.
<b>Direct Needle</b>	Select a specific needle <i>on the display</i> and move directly to it in one movement.
<b>Manual Trim at Sewing Head</b>	Execute a manual trim from <i>any</i> sewing head without walking to the automat.
<b>Sub Soft Limits</b>	Three different frame or hoop sizes can be stored within Soft Limits.
<b>Password Design Security</b>	Password protection for designs in memory. The Memory Out function is disabled unless password is entered.

## Machine Options

There are a variety of BENS models available.

### **Drop Table System**

The Drop Table machine can sew finished goods, such as caps. It has a tubular pantograph frame that uses sets of pantograph arms to attach standard wooden hoops or spider hoops in distancing boards.

### **Bridge Machine**

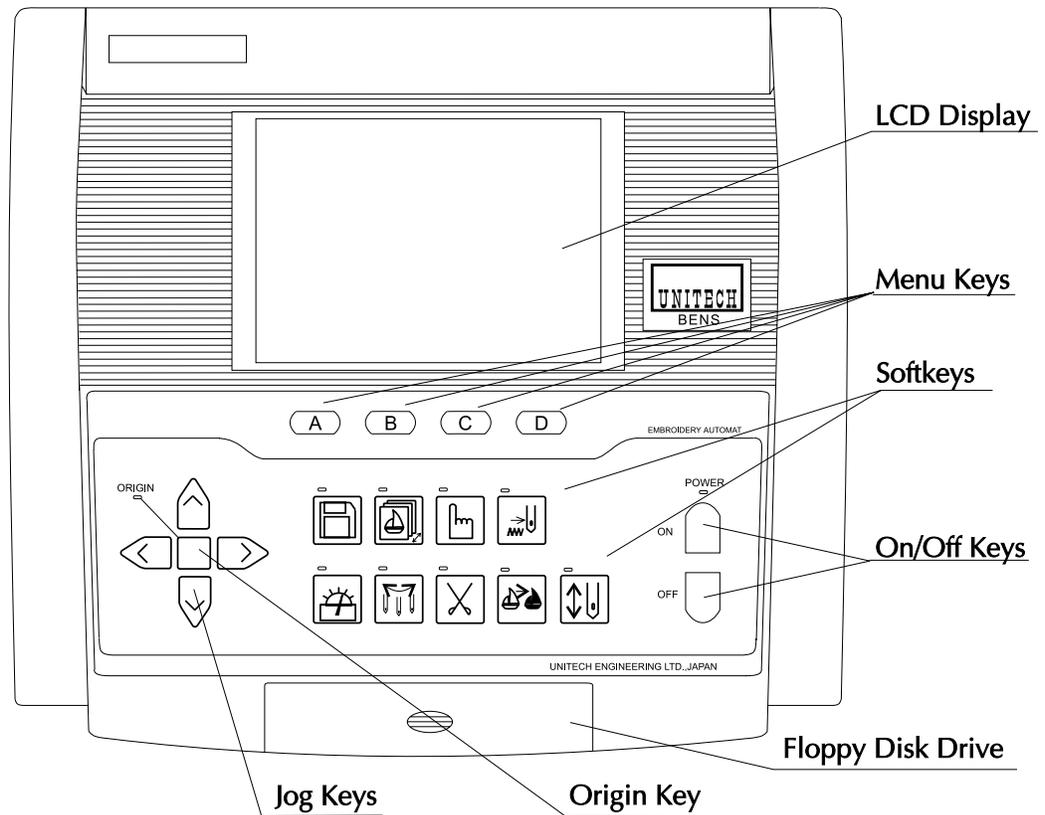
The Bridge machine enables embroidery of bolts of cloth. The heads are suspended from a central beam, allowing the material to pass freely from the front to the back, through the pantograph area. The bridge machine also offers a larger sewing field.

### **UTSM**

The Under Thread Stop Motion sensor detects bobbin thread breaks. The thread detection light blinks green when bobbin thread problem is detected.

## Automat Components

The BENS automat contains all the tools you need to operate the machine, move through various menus and execute menu commands.



### Liquid Crystal Display

The automat has a 40-character, 30-line liquid crystal display that shows information about patterns read into memory and provides a command line of menu selections, using easily recognized icons.

### Menu Keys

Menu keys (A-D) correspond to the icon command line displayed above them on the LCD. The icons change accordingly, as you advance through the various functions.

## Jog Keys

Four arrow keys position the hoop by moving the pantograph under the needle. The arrows point in the opposite direction that the pantograph moves. Vertical movements are from left to right and horizontal movements are from front to back.

The jog keys move the pantograph in single pulse movement of 0.1mm, by pressing the key once; continuous movement, by pressing and holding the key down; and microfeed movement, by pressing the key once briefly and quickly pressing it a second time, then holding it down.

## Origin Key

The unmarked key in the center of the jog keys, moves the pantograph back to the starting point, or the origin, of the pattern.

## On/Off Keys

Turn the power to the machine on or off directly from the automat. The machine beeps one long beep indicating it has been powered on.

**NOTE: The On/Off keys on the automat do not turn off the driver box power.**

## Built-In Floppy Disk Drive

The BENS has a built-in 3.5" floppy disk drive by which patterns can be read into internal memory for permanent storage.

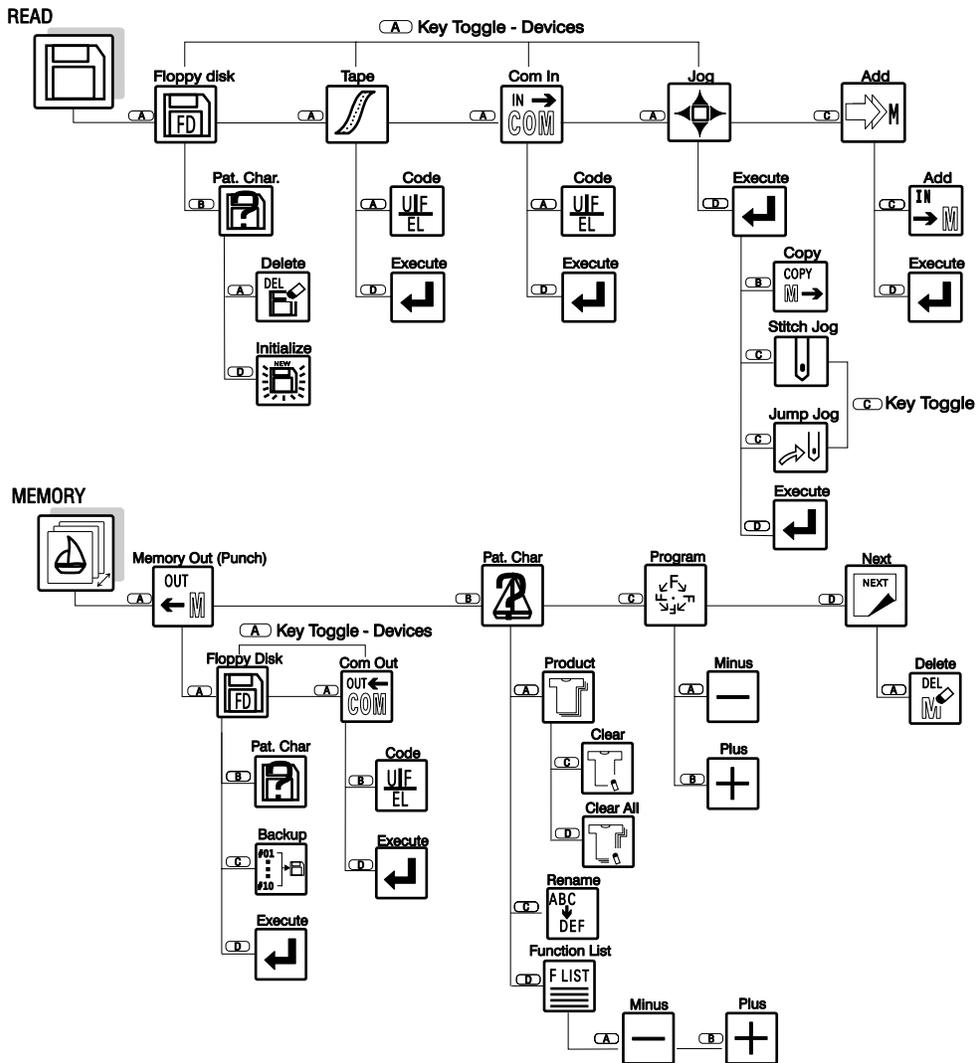
## Softkeys

The BENS softkeys are easily recognized icon keys that open a specific menu on the LCD display.

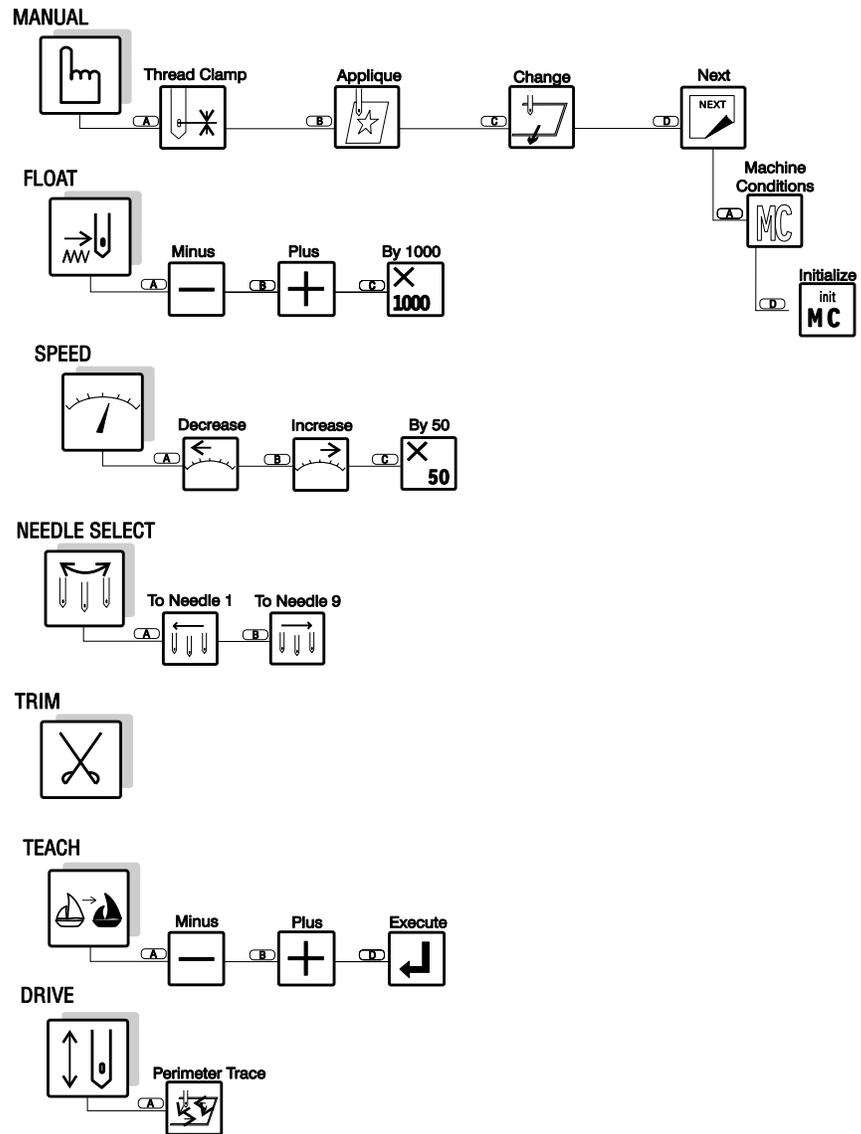
	<p><b>READ</b></p> <p>Opens the Read menu. Used to transfer patterns from floppy disk or peripheral devices to the BENS internal memory. Also accesses floppy disk utilities.</p>
	<p><b>MEMORY</b></p> <p>Opens the Pattern List and Memory menu. Used to work with patterns stored in internal memory. Accesses Pattern Characteristics and Production statistics, as well as the Rename and Delete commands.</p>
	<p><b>MANUAL</b></p> <p>Opens the Manual menu. Used to execute specific machine operations, such as Clamp and Appliqué. Also accesses Machine Conditions parameters that control the productivity of the machine.</p>
	<p><b>FLOAT</b></p> <p>Places the machine in Float mode. Lets the machine move through the pattern without sewing.</p>
	<p><b>SPEED</b></p> <p>Opens the speed control display. Lets you increase or decrease the machine sewing speed.</p>
	<p><b>NEEDLE</b></p> <p>Opens the needle selection menu. Lets you select the needle you want to sew with.</p>
	<p><b>TRIM</b></p> <p>Executes a manual thread trim on all active sewing heads.</p>
	<p><b>TEACH</b></p> <p>Opens the Teach menu. Used to locate and change existing function codes in a pattern.</p>
	<p><b>DRIVE</b></p> <p>Places the machine in Drive mode, ready to sew.</p>

# Menu Overview

The menu structure illustrates the basic operations found on the BENS. Some levels of the menu are not represented in the diagram below.

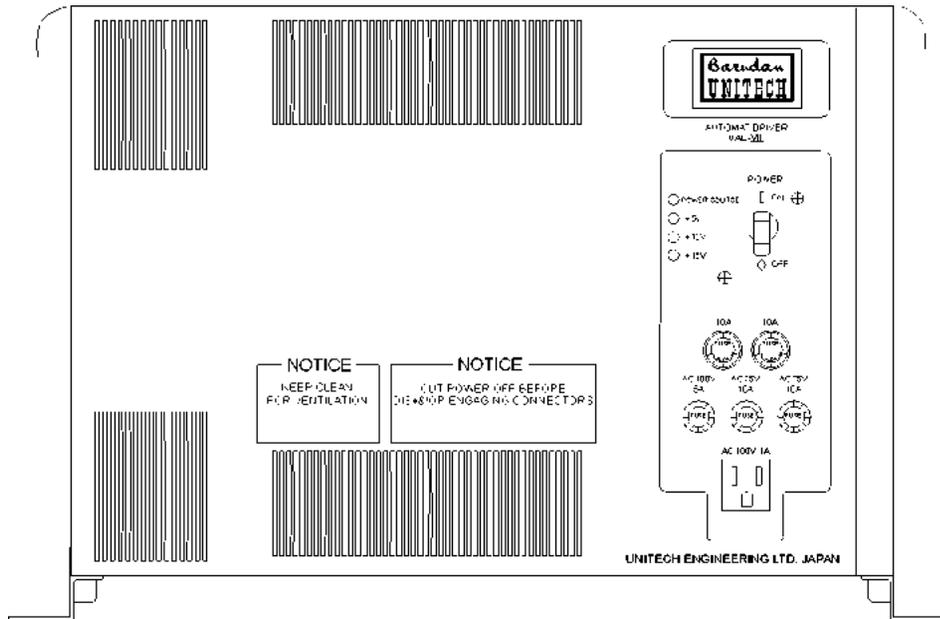


# Menu Overview

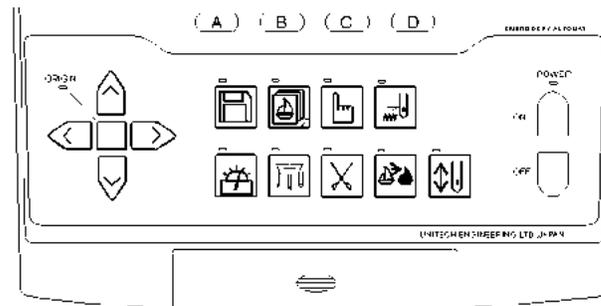


## Powering on the Machines

There are two power switches on the BENS. One is located on the driver box.



The second is a softkey located on the automat.



### Powering On

1. Lift the **ON/OFF** switch on the driver box to the on position. The green lamp on top of the switch comes on.

**NOTE:** A machine malfunction may trip the breaker on the driver box. The switch will be between the on and off positions when the breaker is tripped. If this happens, first check for any possible cause. If nothing is

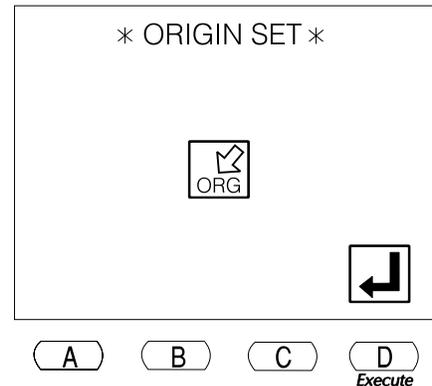
**apparent, push the lever down then return it to the on position. If this occurs again, consult your technician.**

2. Press the green **ON** softkey on the automat. You will hear the fan in the driver box, and in a few moments, the LCD display will come on. The machine beeps loudly indicating it was powered on.
3. Press **D**, below the **Execute icon**, to allow the machine to seek its origin.

**NOTE: To bypass seeking the machine origin, press A, and hold it down for about five seconds, until the Origin Set screen disappears.**

**NOTE: If the BENS shut off because of a power failure while it was sewing, and the needle remained in the fabric, you will need to execute one of the manual functions, such as a thread trim, to raise the needle before moving the pantograph, to avoid damage to the machine.**

Once the origin is set, a blank LCD screen displays.



### **Powering Off**

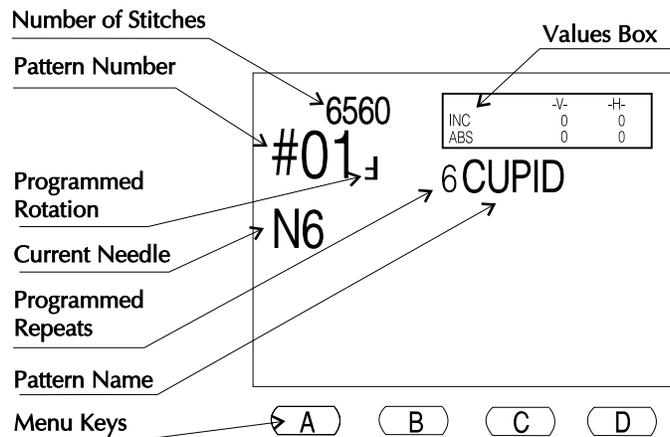
1. Press the red **OFF** softkey on the automat.
2. When the machine will not be used for a long period of time, it is best to turn off the power at the driver box. The green lamp above the switch will no longer be lighted. This precaution will prevent the machine from powering on, even if the **ON** key on the automat is pressed.

**CAUTION! Although the BENS is built to withstand electrical surges, it is best to switch the power off during electrical storms, making sure to switch the breaker off on the driver box, and unplug the machine. You may also want to do this when the machine is shut down at the end of the day.**

## BENS Screen

The basic screen displays when you first power on the machine, before any of the softkeys have been pressed. The various menus display at the bottom of the LCD screen when the softkeys are pressed. Pressing the softkey again, while its menu is displayed, will usually close the menu and return to the basic screen.

This basic screen also displays after certain menu commands have been completed. The illustration below identifies the information displayed at the basic screen.



### Values Box

The information in the Values Box helps you identify the current pantograph position, in relation to the pattern origin and the previous position.

- V-** Represents **left** and **right** movement of the pantograph.
- H-** Represents **up** and **down** movement of the pantograph.
- INC** Incremental movement (shown in V and H values) relative to the previous stitch, or previous pantograph position.
- ABS** Absolute movement (shown in V and H values) from the pattern origin.

---

## Updating the System

The BENS lets you manage the system software and pattern memory. By holding down certain softkeys when you turn on the machine, you can update the software and quickly erase the entire pattern memory.

### Software Updates

When you receive system software updates, or if you suspect that the system software has become corrupted, you can easily install the software.

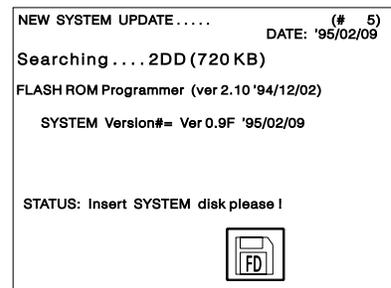
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#### Installing Software Updates

1. Turn off the BENS.
2. While the machine is off, press and **hold the Read softkey**. While holding the Read softkey, press the **ON softkey**. Continue to hold down the Read softkey. The system update screen displays, prompting you to insert the system disk.
3. Insert the update disk in the floppy disk drive. The BENS automatically reads the system disk and begins the update.  
When the process is complete, the BENS beeps and the Origin Set screen displays.
4. Press **D**, below the **Execute icon**, to let the machine seek origin.



Read  
Softkey



Memory  
Softkey

#### Erasing Pattern Memory

When you no longer need the patterns stored in memory, you can quickly delete them all at once, instead of erasing them one at a time with the Delete command.

## Erasing all Patterns in Memory

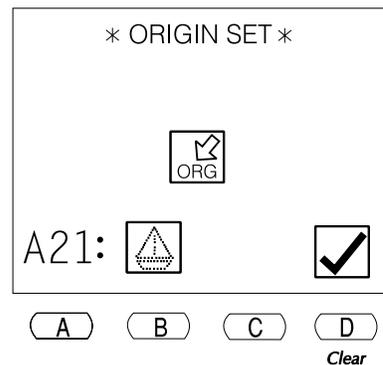
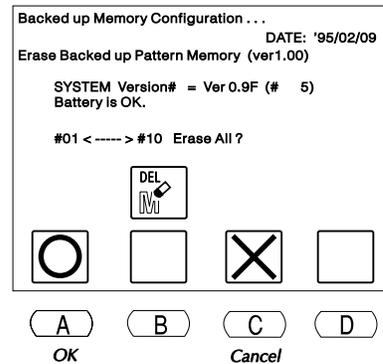
1. Turn off the BENS.
2. While the machine is off, press and **hold** the **Memory softkey**. While holding the Memory softkey, press the **ON softkey**. Continue to hold down the Memory softkey.

The Memory Erase screen displays:

3. Press **A**, below the **OK icon**, to erase the pattern memory. To cancel the command, press **C**, below the **Cancel icon**.

After a few seconds, the Origin Set screen displays, showing a message indicating that there are no patterns stored in memory.

4. Press **D**, below the **Check icon**, to clear the error message. The machine beeps three times, then the normal Origin Set screen displays.
5. Press **D**, below the **Execute icon**, to let the machine seek origin.



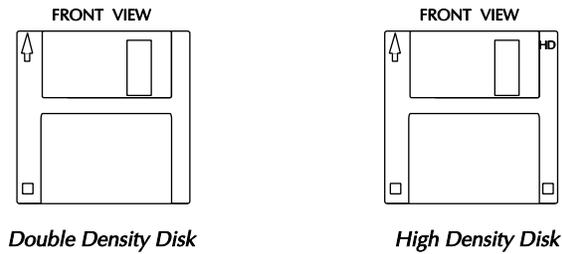
## Floppy Disks

The BENS uses 3.5" floppy disks. Disks come in different capacities: double sided, double density, which hold 720K (0.72 megabytes) of data and double sided, high density, which hold 1.44 megabytes (1440K) of data.

- The BENS can read both double sided, double density and double sided, high density disks (FDR, Tajima, Melco, Happy and Toyota formats on 2DD or 2HD, all others only double density).
- The BENS can only write to FDR format disks, on either 2DD or 2HD disks.

**NOTE: FDR2HD disks are MS-DOS format. Therefore, these pattern disks can be read, copied, and transferred via personal computer. FDR2DD format is proprietary, and cannot be used this way.**

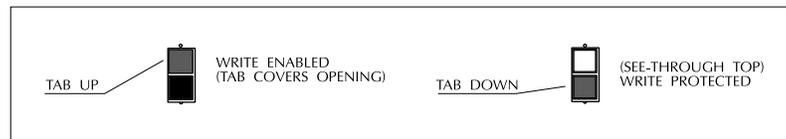
**NOTE: Older models of Barudan equipment (i.e. M Series machines, FDR3 or FDR5 disk readers) can only read FDR format on 2DD disks).**



Most high density disks have the letters HD printed on them. If your disks are not marked, check the box they came in for markings. Another way to tell the disk type is that high density disks have two holes, while double density disks have only one.

Floppy disks should be handled carefully to safeguard their contents.

- Do not touch the exposed area of magnetic film.
- Keep disks away from magnetic fields.
- Avoid exposing disks to temperature extremes and humidity.
- Make sure the disks are labeled to avoid accidentally erasing files.



*Floppy Disk Write Protection*

- Make sure the disk is write-protected to avoid accidentally overwriting files or erasing the disk. The small sliding notch in the corner of the disk is the write-protect tab. When the disk is write-protected, the little square is an open space. When the disk is not write protected, the tab covers the opening.

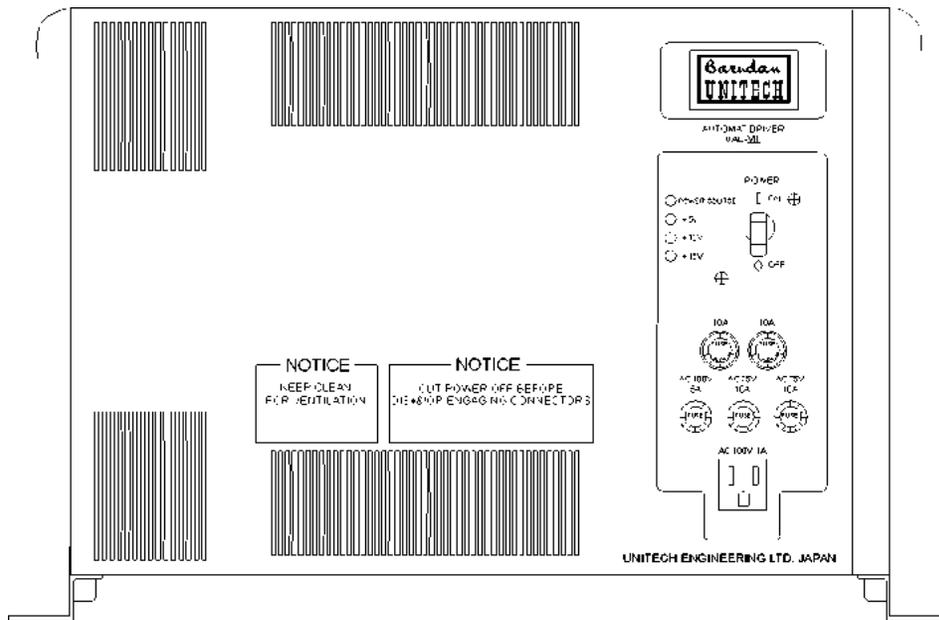
## BENS Connections

To connect peripheral devices to the BENS, you will need to know the location of the power source and connection ports, as well as the cables used to communicate.

### Power for Peripherals

Improper power sources can damage your peripheral devices. The BENS has one AC100V outlet, located on the front of the driver box. Use this outlet as the power source for your Barudan peripheral devices.

**CAUTION! Do not plug any Barudan peripheral equipment directly into a wall outlet. The outlet on the BENS was specifically designed for Barudan accessories. Do not plug non-Barudan accessories into the AC100V outlet.**



## Connections

There are several peripheral devices that can be used with the BENS. These devices communicate through either the BENS tape port or the BENS COM port.

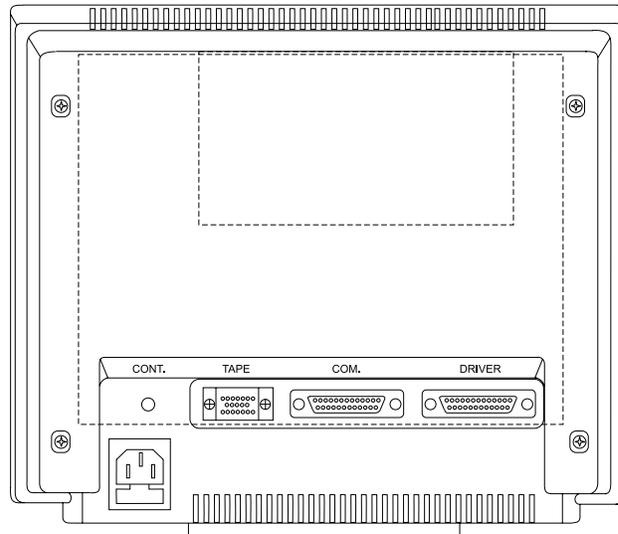
### Tape Port

The BENS can load patterns through the tape port, with the parallel input cable attached to the automat. Barudan peripheral devices such as the PTR-V tape reader and the

JM-IV keyboard have tape output connections that are compatible with the BENS. The chart on the following page identifies the devices that communicate through the tape port and the cables used to connect them.

### **BENS COM Port**

The BENS can load patterns from, and save to, devices connected with the optional communication (COM) cable. The COM cable connection port is on the back of the automat. The chart on the following page identifies the devices that communicate through the COM port and the cables used to connect them.



### **Specifications**

- RS-232C cable
- 9 pins DUB Connector (AT compatible)
- Baud rate 9600 bps
- Stop bits: 2
- Data bits: 8
- Parity: None
- Handshake XON/XOFF flow control: None

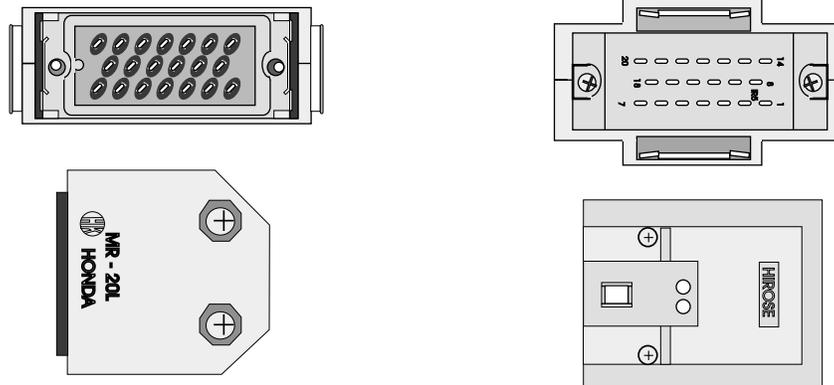
<b>BENS CONNECTIONS</b>				
<b>FROM</b>	<b>PORT</b>	<b>TO</b>	<b>PORT</b>	<b>CABLE</b>
BENS	COM	BP-II	Input: 2 (Serial)	COM
BENS	COM	UTP-III	COM	COM
BENS	COM	FDR-III	COM	COM
BENS	COM	FDR-V	COM	COM
FMC	Data Out	BENS	Tape	E & B
FMC-II	Data Out 1	BENS	Tape	E
FMC-II	Data Out 2	BENS	Tape	B & E
LD-II	Data Out 1	BENS	Tape	B & E
LD-II	Data Out 2	BENS	Tape	B & E
PTR-5	Data Out	BENS	Tape	E
FDR-III	Tape Out	BENS	Tape	E
FDR-V	Tape Out	BENS	Tape	E
FDR-III	COM	BENS	COM	COM
FDR-V	COM	BENS	COM	COM
JM-II	Data Out	BENS	Tape	B & E
JM-IV	Data Out	BENS	Tape	B & E

## **Cables and Connectors**

There are two reader cables used to connect the BENS to Barudan peripheral devices. The illustrations on the following page will help you identify the connectors.

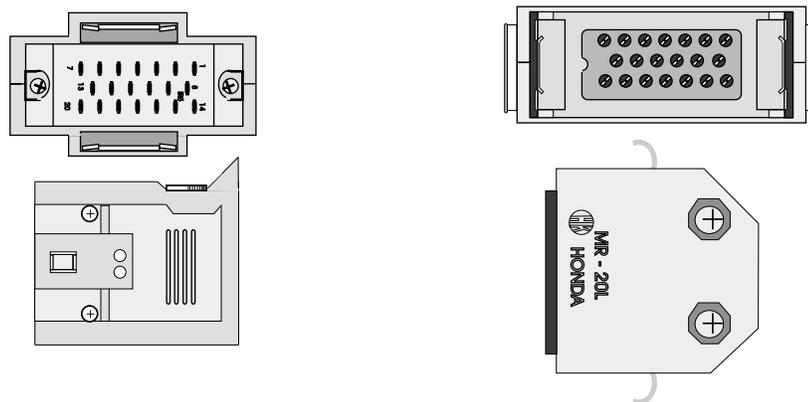
## The B Cable

The B cable connectors are the Honda male, Type B and the Hirose male.



## The E Cable

The E cable connectors are the Hirose Button Release female and the Honda female.

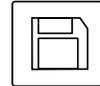


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## **Chapter 2**

# **Memory Operations**

## Reading Patterns



Read  
Softkey

You must read a pattern into the BENS to store it in the machine's memory. Patterns in memory can be sewn or programmed. The three sources that read patterns to memory are:

- Built-in Floppy Disk Drive
- Paper Tape Reader, connected to the reader port
- Barudan peripheral devices, connected to the serial (COM) port.

The Read menu has a fourth option, Jog, that is used to merge two or more patterns in memory, with movement between.

## Reading Patterns on Disk

The BENS reads disks in **FDR**, **FDR-HD**, **FMC**, **Tajima**, **ZSK**, **Melco (old)**, **Melco (DOS)**, **Toyota**, and **Happy** formats. The BENS automatically determines the disk format. It is not necessary to specify format before reading a disk.

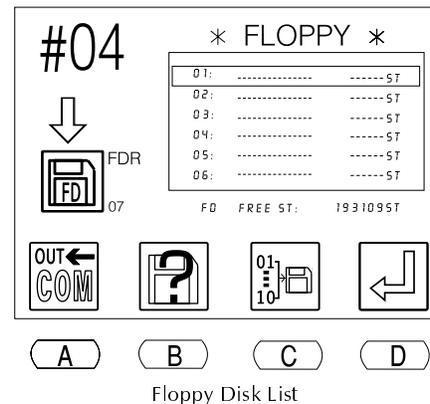
### Reading a Pattern from Floppy Disk

1. Open the disk drive cover and insert the floppy disk.
2. Press the **Read softkey**. The floppy disk list displays, showing the patterns on that disk.

**NOTE: If you did not insert a disk in Step 1, or it is blank, the list does not show any patterns, and error A30 displays. Insert a disk and press D to clear the error.**

The icon at the top left of the screen identifies the active device. It should show the **Disk icon**, indicating the built-in 3.5" disk drive. If this is not the current icon, press **A**, below the **Device icon**, until it displays at the top left. Pressing A toggles through the device options: Disk, Tape, COM and Jog.

3. Use the **jog keys** to select the desired pattern from the list. A box outline displays around the selected pattern.
  - The up and down jog keys move one pattern at a time.



- The left and right jog keys move to the previous/next page of the list. The BENS automatically identifies the next empty memory location, where the pattern from disk will be stored. This number, in the middle left of the screen, flashes.

**NOTE: You can also save to an occupied memory location, adding to an existing pattern. See Merging Patterns for instructions.**

- If desired, press **B**, below the **Pattern Characteristics icon**, to display additional information about the pattern on disk.

**NOTE: Pattern Characteristics only display for patterns on FDR, FMC and Tajima format disks. Pattern Characteristics for other industry format disks show Ø for all values.**

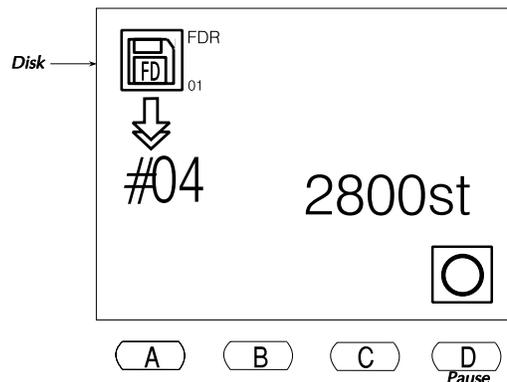
- Press **B** again to close the Pattern Characteristics screen and return to the floppy disk list.

4. Press **D**, below the **Execute icon**, to transfer the selected pattern to memory. To exit the menu without transferring a pattern to memory, press the **Read softkey**.

The display shows a count of the stitches as they are transferred.

- To stop the transfer, press **D**, below the **Pause icon**.
- Press **D** again to **resume**. Press **C**, below the **X icon**, to cancel.

When complete, the BENS beeps, and the basic screen displays.



## Reading Patterns from Tape

Manufacturers use proprietary codes for patterns on paper tapes. The BENS reads tapes in the following formats:

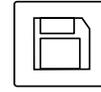
- U: Barudan
- F: Fortron (ZSK, Melco)
- El: El-tac (Happy, Tajima) codes.

Paper tapes can be read from peripherals using parallel or serial connections. The connection type your tape reader uses determines whether you choose Tape or COM for the device. Parallel devices use Tape; Serial devices use COM.

The following Barudan devices communicate with the BENS using the Tape connection: PTR-V, PTR-VI, FDR-III, FDR-V, and JM-IV.

## Reading a Pattern through the Tape Connection

1. Connect the tape reader to the BENS tape port and load the paper tape, following the instructions in the tape reader's user manual. See page 1-23 for instructions on connecting tape readers to the BENS.
2. Press the **Read softkey**. The floppy disk list displays.



Read Softkey

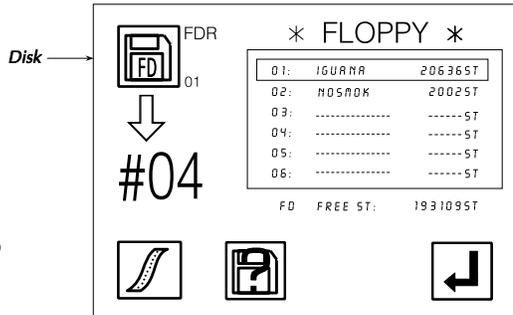
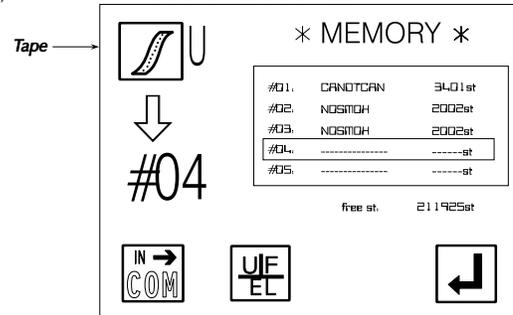
If there is not a disk in the disk drive, and Disk was the last device used, **error A30** displays. Press any menu key to clear the message, then proceed with Step 3.

3. The icon at the top left of the screen identifies the active device. It should show the **Tape icon**, indicating communication through the tape reader port. If this is not the current icon, press **A**, below the **Device icon**, until it displays at the top left. Pressing **A** toggles through the device options, Read, Tape, COM and Jog.

The BENS automatically identifies the next empty memory location, where the pattern will be stored. This number, shown in the middle left of the screen, flashes.

**NOTE: You can also save to an occupied memory location, adding to an existing pattern. See page 2-21 for instructions.**

4. The letter to the right of the device icon identifies the tape code.
  - If necessary, press **B**, below the **Code icon**, to select the appropriate paper tape code. Pressing B toggles through the three code options: U, F and El.



- Press **D**, below the **Execute icon**, to transfer from paper tape. To exit without transferring a pattern, press the **Read softkey**.

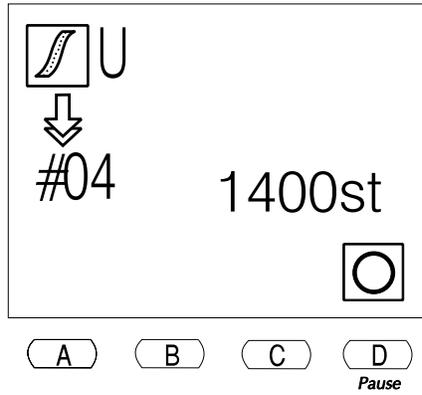
The display shows a count of the stitches as they are transferred.

- To stop the transfer press **D**, below the **Pause icon**.

**NOTE: Pause will not function if you are using the PTR-5, or any other peripheral device without buffer memory.**

- Press **D** again to resume. Press **C**, below the **X icon**, to cancel.

When complete, the BENS beeps and the basic screen displays.



## Reading Patterns from COM

Patterns can also be read into the BENS from peripheral devices using the serial communication port (COM).

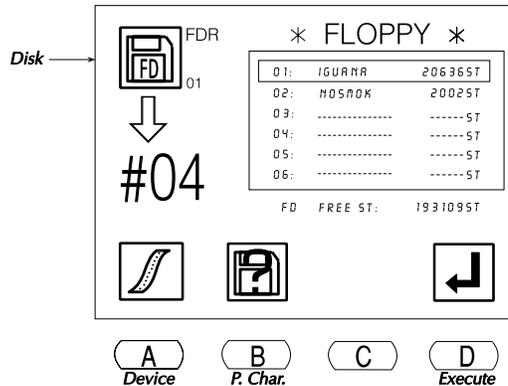


Read Softkey

### Reading a Pattern through the COM Connection

- Connect the serial peripheral to the BENS COM port and prepare it following the instructions in its user manual. See page 1-23 for instructions on connecting devices.
- Press the **Read softkey**. The floppy disk list displays.

**NOTE: If there is not a disk in the disk drive, and Disk was the last device used, error A30 displays. Press any menu key to clear the message, then proceed with Step 3.**



- The icon at the top left of the screen identifies the active device. It should show the **COM-In icon**, indicating communication through the COM port. If this is not the current icon, press **A**, below the **Device icon**, until it displays at the top left. Pressing **A** toggles through the device options, Disk, Tape, COM and Jog.

The BENS automatically identifies the next empty memory location, where the pattern will be stored. This number, shown in the middle left of the screen, flashes.

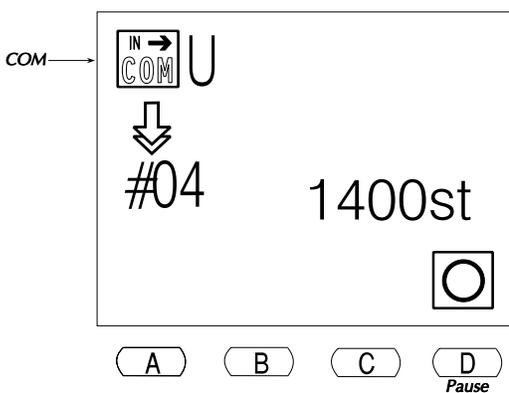
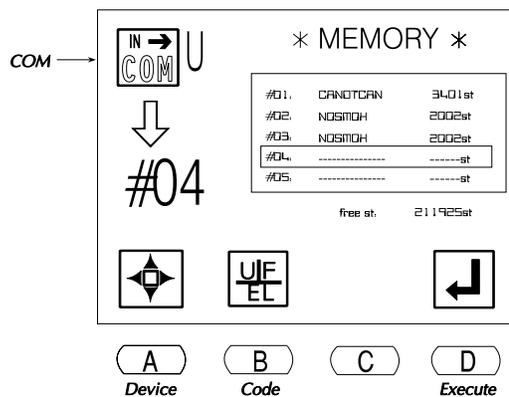
**NOTE: You can also save to an occupied memory location, adding to an existing pattern. See page 2-21 for instructions.**

- The letter to the right of the device icon identifies the **Tape code**. If necessary, press **B**, below the **Code icon**, to select the appropriate code. Pressing **B** toggles through the three code options: U, F, and El.

- Press **D**, below the **Execute icon** to transfer from paper tape. To exit without reading in a pattern, press the **Read softkey**. The display shows a count of the stitches as they are transferred.

- To stop the transfer, press **D**, below the **Pause icon**.
- Press **D** again to **resume**. Press **C**, below the **X icon**, to cancel.

When complete, the BENS beeps and the basic screen displays.



## Floppy Disk Utilities

Floppy disks supplement machine memory with additional storage, provide permanent pattern storage, and a method of transferring designs to other machines. A low density disk holds approximately 210,000 stitches, in up to 36 patterns.

### Initializing a Floppy Disk

New disks must be initialized (formatted) before they are used. The BENS creates disks in FDR format on either a double sided, double density disk (2DD) or a double sided, high density disk (2HD). **Although the BENS reads disks in other industry formats, it can only create a FDR format disk.**

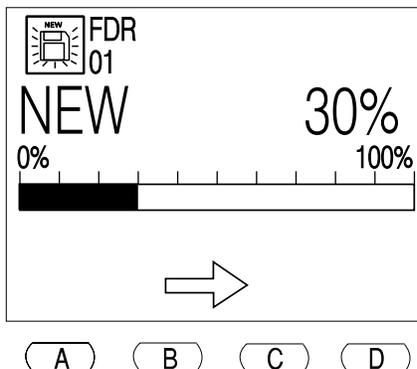
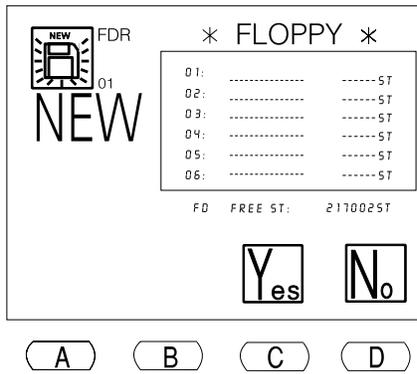
#### Initializing a New Disk

1. Open the disk drive cover and insert the floppy disk.
2. Press the **Read softkey**.

The icon at the top left of the screen identifies the device. It should show the **Disk icon**, for the built-in 3.5" disk drive. If this is not the current icon, press **A**, below the **Device icon**, until it displays. Pressing A toggles through the options: Disk, Tape, COM and Jog. It takes longer than usual to access an unformatted disk. The system is trying to determine if the disk is a format it reads. When the BENS determines it is not formatted, it beeps and displays the initialize screen.

3. Press **C**, below the **Yes icon**, to initialize the disk. To cancel, press **D**, below the **No icon**. During the process, the BENS displays the following status screen.

When complete, the Memory output screen displays, to facilitate transferring patterns in memory to the newly formatted disk. See page 2-27 for information on saving patterns from memory to floppy disk.



To close the Memory output screen without transferring patterns, press the **Memory softkey**.

Initialize can also quickly delete the entire contents of a formatted disk. If you are going to initialize a disk to clear it, use the Floppy list and Pattern Characteristics screen to verify that you really want to erase every design on the disk.

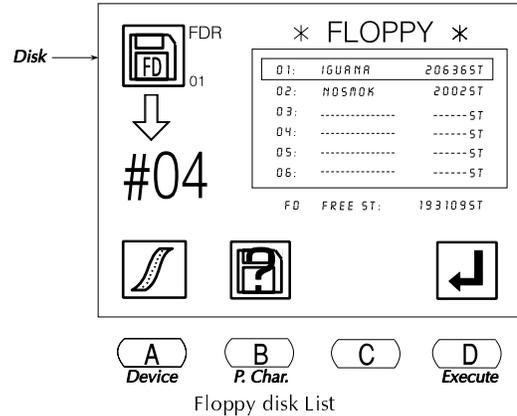
### Initializing a Previously Formatted Disk

1. Open the disk drive cover and insert the floppy disk.
2. Press the **Read softkey**.



Read  
Softkey

The icon at the top left of the screen identifies the active device. It should show the **Disk icon**, indicating the built-in 3.5" disk drive. If this is not the current icon, press **A**, below the **Device icon**, until it displays. Pressing A toggles through the device options: Disk, Tape, COM and Jog. The floppy disk list displays.



3. Press **B**, below the **Pattern Characteristics icon** to open the pattern characteristics screen. The initialize icon is now displayed.
4. Press **D**, below the **Initialize icon**. To cancel, press **B**, below the **Pattern Characteristics icon**, returning to the Floppy List. The initialize screen displays.
5. Press **C**, below the **Yes icon**, to initialize. To cancel and return to the Pattern Characteristics screen, press **D**, below the **No icon**.

During the process, the BENS displays a status screen. When complete, the Memory output screen displays, to facilitate sending patterns to the newly formatted disk. See page 2-27 for information on saving patterns from memory to the floppy disk.

To close the Memory output screen without transferring patterns, press the **Memory softkey**.

## Deleting Patterns from Disk

Patterns stored on floppy disks can be deleted from the Read menu.



Read  
Softkey

### Deleting a Pattern from Floppy Disk

1. Open the disk drive cover and insert the floppy disk.

2. Press the **Read softkey**.

The icon at the top left of the screen identifies the active device. It should show the **Disk icon**, indicating the built-in 3.5" disk drive. If this is not the current icon, press **A**, below the **Device icon**, until it displays at the top left. Pressing A toggles through the device options: Disk, Tape, COM and Jog.

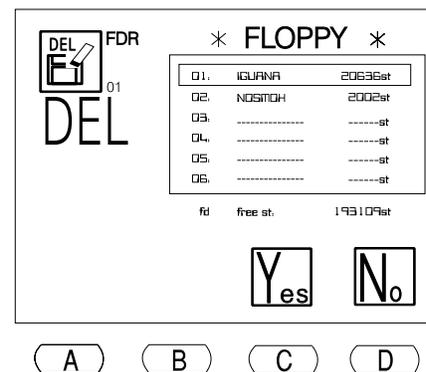
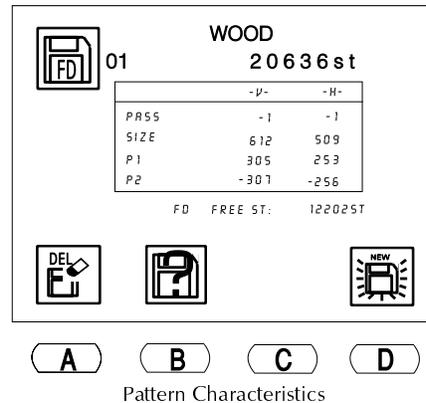
The floppy disk list displays, showing the patterns stored on that disk.

3. Use the **jog keys** to select the desired pattern from the list. A box outline displays around the selected pattern.
4. Press **B**, below the **Pattern Characteristics icon** to access the Delete option. The delete icon displays.
5. Press **A**, below the **Delete icon**, to erase the selected pattern from the disk.

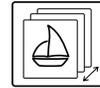
The Floppy list is still displayed, and you can use the jog keys, if necessary, to select a different pattern to be deleted from the disk.

6. Press **C**, below the **Yes icon**, to delete the pattern. To cancel and return to the Pattern Characteristics screen, press **D**, below the **No icon**.

When the pattern has been deleted, the BENS beeps and the floppy list displays.



## Patterns in Memory



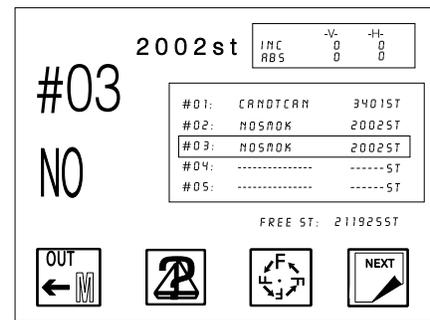
Memory Softkey

There are 10 locations available for pattern storage in the 261,000 stitch internal memory. A pattern stored in memory can be sewn or programmed.

### Pattern List

Pressing the **Memory softkey** displays the Pattern List. In the example below, the list shows three patterns in memory, and the number of stitches in each.

- The large number at the top left of the screen identifies the selected pattern. In the Pattern List, the selected pattern has a box around it.
- Empty locations are shown in the list with a series of dashes across the name and stitch count areas. If an empty memory location is selected, its number flashes at the top left of the screen.
- Available stitches in memory is shown below the list.



Pattern List Screen

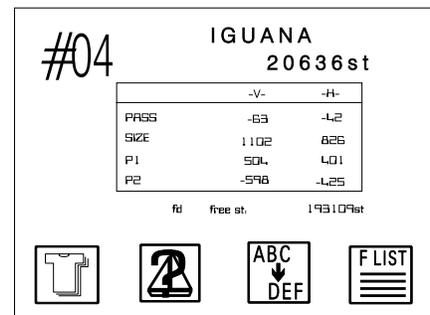
Use the jog keys to move through the Pattern List.

- The up and down jog keys move one pattern at a time.
- The left and right jog keys move to the previous/next page of the list.

### Pattern Characteristics

The Pattern Characteristics screen shows information about a pattern in memory or on floppy disk. Pattern Characteristics for patterns on floppy disk are accessed from the Read menu (see page 2-3). Pattern Characteristics shows the following information.

**PASS** Distance between the start and end points, shown as horizontal and vertical values, measured in tenths of millimeters.



Pattern Characteristics Screen

- SIZE** Overall dimensions of the pattern, from lower left to upper right corners, measured in tenths of millimeters.
- P1** Distance between the start point and bottom left corner of the pattern, measured in tenths of millimeters.
- P2** Distance between the start point and top right corner of the pattern, measured in tenths of millimeters
- Free st** Total number of stitches available in memory.

The Pattern Characteristics screen also has options pertaining to patterns stored in memory: *Function List*, *Rename*, and *Product List*.

### Viewing Pattern Characteristics

1. Press the **Memory softkey**. The Pattern List displays, showing the patterns stored in memory.
2. Use the **jog keys** to select a pattern from the list. A box outline displays around the selected pattern.
3. Press **B**, below the **Pattern Characteristics icon**, to open the Pattern Characteristics screen.
4. Press **B** again to close the Pattern Characteristics screen, and return to the Pattern List screen. Press the **Memory softkey** to close the Pattern List screen.



Memory Softkey

### Function List

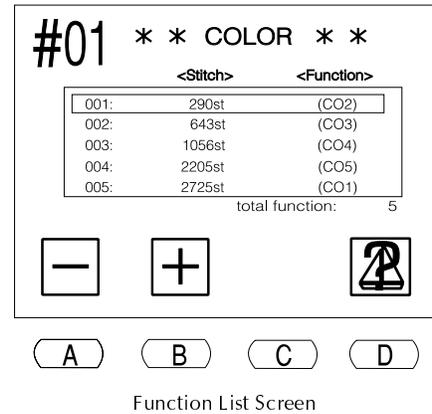
The Function List option, available at the Pattern Characteristics screen, displays a list of **all color change function codes** in the selected pattern.



The function list lets you easily see a pattern's entire color sequence. **Color codes can be changed in the function list**, instead of searching and changing only one code at a time with Teach. For information on Teach, see page 3-17.

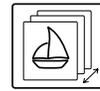
The Function List screen shows the following information:

- Stitch number where each code is located.
- The Function code number - the number in parentheses identifies the corresponding needle number.
- Total number of function codes in the pattern.



### Changing a Pattern's Color Sequence from the Function List

1. Press the **Memory softkey**. The Pattern List displays, showing the patterns stored in memory.
2. Use the **jog keys** to select a pattern. A box outline displays around the selected pattern.
3. Press **B**, below the **Pattern Characteristics icon**, to open the Pattern Characteristics screen.
4. Press **D**, below the **Function List icon**, to display the list of color change functions in the pattern.



Memory Softkey

**NOTE: The list displays up to 400 color change codes.**

5. Use the **jog keys** to move through the list and select the code you want to change. A box outline displays around the selected code.

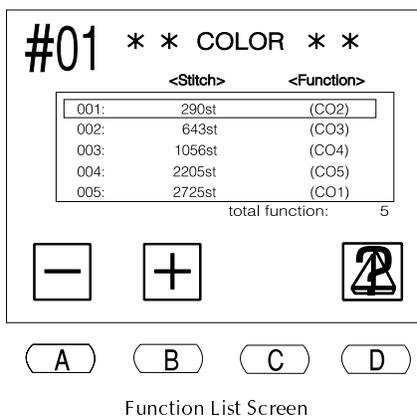
6. Use the menu keys to change the color code.
  - Press **A**, below the **Minus icon**, to move to the previous code.
  - Press **B**, below the **Plus icon**, to move to the code after the current code.

Notice that when a code is changed, it displays with a darker box behind it, showing this is not the original code.

**NOTE: The Function List screen *does not* have a cancel option. All changes are confirmed when you exit.**

**Before changing codes, make sure you have a record of the original, in writing or another copy of the pattern, in case you want to restore the original color sequence.**

7. Press **D**, below the **Pattern Characteristics icon**, to return to the Pattern Characteristics screen.
  - Press **B**, below the **Pattern Characteristics icon**, to return to the Pattern List screen.
  - Press the **Memory softkey** to close the Pattern List screen.

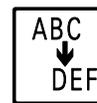


## Rename

Pattern in memory can be renamed from the Pattern Characteristics screen.

### Renaming a Pattern

1. Press the **Memory softkey**. The Pattern List displays, showing patterns in memory.
2. Use the **jog keys** to select a pattern. A box outline displays around the selected pattern.
3. Press **B**, below the **Pattern Characteristics icon**, to open the Pattern Characteristics screen.



Rename Icon



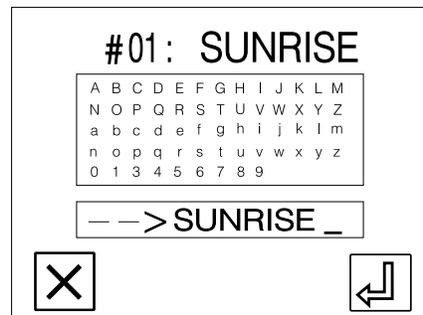
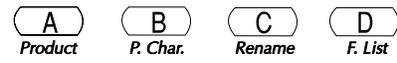
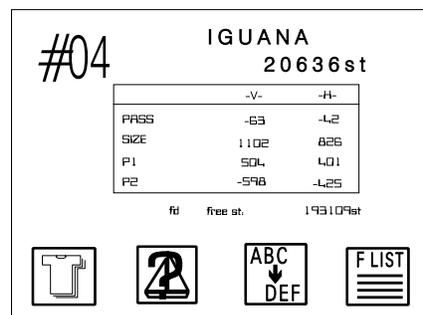
Memory Softkey

4. Press **C**, below the **Rename icon**. A list of alphabet and numeric characters displays, along with the current name.
5. Press **A**, below the **Backspace icon**, to delete the characters in the old name. Each time you press A, another character is deleted.
6. A box displays around the selected character in the list. Use the **jog keys** to move the box to the first character of the new name.

**NOTE: Although the Pattern List shows upper and lower case letters exactly as entered, if the pattern is later saved to floppy disk, lower case letters are automatically changed to upper case.**

7. Press the **origin key**, in the center of the jog keys, to enter the selected character in the pattern name.
8. Repeat Steps 6 and 7 until the entire name is programmed. A pattern name can contain **up to eight characters**. If you make an error, press **A**, to backspace.

9. Press **D**, below the **Execute icon**, to accept the new name. To cancel, press the **Memory softkey**, exiting without changing the pattern name. When complete, the BENS beeps and the basic screen displays. If desired, press the **Memory softkey** to see the list and verify the new pattern name.



## Program

Program parameters control the appearance of a pattern as it is punched or sewn. Changes in the physical characteristics of a pattern which do not involve fundamental modifications (such as the total number of stitches) are made by changing Program parameters. The pattern is sewn according to parameters set in Program. Program changes are pattern specific, they affect only the one pattern, not all patterns in memory.



Program Icon

When a programmed pattern is selected in the pattern list, a darker box displays behind its memory location number. This makes it easy to tell that a pattern has been programmed.

### PROGRAM OPTIONS

PARAMETER	RANGE OF VALUES	DEFAULT VALUE	FUNCTION		
	1	V Scale	50 - 200 %	100%	Scales the pattern from left to right between 50% and 200% of its original size.
	2	H Scale	50 - 200 %	100%	Scales the pattern from top to bottom between 50% and 200% of its original size.
	3	ROT pattern	1 - 8	1	Rotates a pattern counterclockwise, in 90° increments. Settings 5-8 add mirror imaging to the rotation.  When the value for this parameter is changed, the icon shown on the left side of the screen also changes to reflect the programmed rotation.

	PARAMETER	RANGE OF VALUES	DEFAULT VALUE	FUNCTION
	4 Angle	Ø° - 89°	Ø°	Rotates a pattern counterclockwise, in 1° increments.
	5 Origin	ON/OFF	ON	When On, automatically returns the pantograph to the pattern origin, when sewing has been completed.
	6 Socks	Ø-3	Ø	Used for the sock frame attachment, automatically programs two repetitions of a pattern, letting you set up spacing between each pattern for the frame that will be used. Ø = Off
				1 = On - Normal setup 2 = On - second repetition mirrored 3 = On - second repetition rotated 180°
				When Socks is on, Origin (# 5) is automatically turned off, so the machine can alternate between two origin points. See the <i>Mechanical Guide</i> for instructions.
	7 Appliqué	ON/OFF	OFF	Moves the pantograph forward for easy placement of appliqué fabric. The default movement is 1-1/2 times the height of the pattern. A new value can be programmed in the A. Offset parameter.
	8 A. Offset	-999mm to 300mm	Ømm	Sets the amount the pantograph will move when Appliqué is on. If set at Ø, the pantograph moves 1-1/2 times the height of the pattern.

	PARAMETER	RANGE OF VALUES	DEFAULT VALUE	FUNCTION
	9 Frame	ON/OFF	OFF	Automatically moves the pantograph forward at the end of the pattern, by the height of the pattern, unless a new value is programmed in F. Offset parameter.
	10 F. Offset	-999mm to 300mm	Ømm	Sets the amount the pantograph will move when Frame is on. If set at Ø, the pantograph moves forward by the height of the pattern.
	11 Repeat	1 - 201	1	Sets the number of times a pattern will be repeated. Set at 201, the pattern will sew an infinite number of repeats.
	12 CAP Frame	Ø - 2	Ø	Sets the machine up for a cap frame, enabling use of the raised throat plate, or spectacle frame, allowing you to merge patterns executing pantograph movement exactly as programmed. Ø = Off 1 = Cap Frame 2 = Spectacle Frame
	13 Frame Type	0-3	0	Able to set frame preference for the use of sub soft limits. 0 - off, Frame 1, 2, 3 programmable.

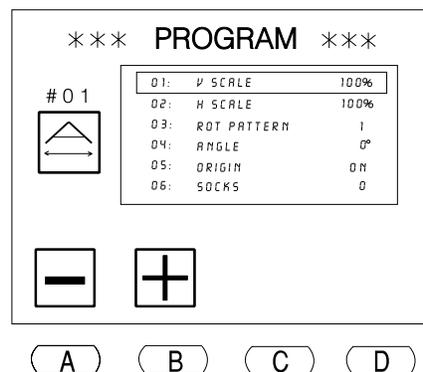
### Changing Program Parameters

1. Press the **Memory softkey**. The pattern list displays, showing the patterns stored in memory.
2. Use the **jog keys** to select a pattern from the list. A box outline displays around the selected pattern.
3. Press **C**, below the **Program icon**. The list of program options displays.



Memory Softkey

4. Use the **jog keys** to move through the list, until the option you want to change is selected. A box outline displays around the selected option.
5. With the desired option selected, use the **A** and **B** menu keys to change the value. Refer to the table on the preceding pages for a description of each option and its range of values.
  - Press **A**, below the **Minus icon**, to decrease the value.
  - Press **B**, below the **Plus icon**, to increase the value.



**NOTE: Options with a toggle value change when either A or B is pressed.**

When an option is changed from the default value, a dark box displays behind it in the list, showing that it was changed. If you go back into Program for this pattern later, changed parameters still show a dark box.

6. When done programming the pattern, press the **Memory softkey**, to save changes and close the Program list.

**NOTE: Programming changes to a pattern are saved with it when it is transferred to disk or tape.**

When a pattern that was programmed is selected in the pattern list, a dark box displays behind its memory location number, so it is easy to tell it was programmed. The basic screen shows the programmed repeats and a picture of the programmed rotation. See page 1-19 for the location of this information on the basic screen.

## Deleting Patterns from Memory

Patterns no longer needed can be removed from memory, freeing that location to store a new pattern.

### Deleting a Pattern

1. Press the **Memory softkey**. The pattern list displays, showing patterns stored in memory.



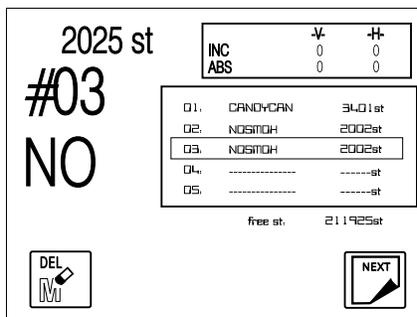
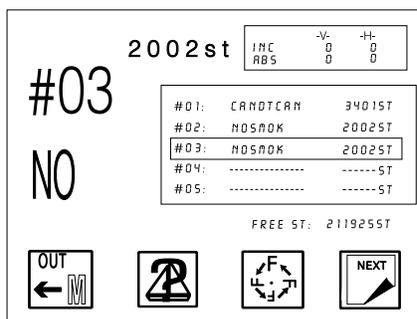
Memory Softkey

- Use the **jog keys** to select a pattern from the list. A box outline displays around the selected pattern.
- Press **D**, below the **Next icon**, to bring up the next menu level. The Delete icon is now displayed.

**NOTE:** Cancel at any time, by pressing the **Memory softkey**, to clear the **Pattern List** and menu icons.

- Press **A**, below the **Delete icon**.
- Press **C**, below the **Yes icon**, to delete the pattern. To cancel, press **D**, below the **No icon**.

When the pattern has been deleted, the BENS beeps and the basic screen displays. If desired, press the **Memory softkey** again, to view the Pattern List and confirm that the pattern was deleted.



## Production Statistics

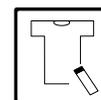
The Production Statistics option shows information for each pattern in memory. It tracks how many times each was sewn, total stitches sewn for each pattern, and total number of times all patterns in memory (combined) were sewn.

You can continue to accumulate statistics, or clear them to start fresh. Use the Clear options to start new totals daily, weekly, or monthly, as suits your needs.

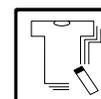
- Clear** Erases production statistics for the **selected pattern**.
- Clear All** Erases production statistics for **all patterns in Memory**.



Product



Clear



Clear All

---

## Viewing the Product List

1. Press the **Memory softkey**. The Pattern List displays, showing the patterns stored in memory.
2. Press **B**, below the **Pattern Characteristics icon**, to display the Pattern Characteristics screen.
3. Press **A**, below the **Product icon**. The Product List displays.
4. Use the **jog keys** to move through the list, and select a pattern. A box displays around the selected pattern.
  - Press and hold **C**, below the **Clear icon**, to clear statistics for the selected pattern.
  - Press and hold **D**, below the **Clear All icon**, to clear the statistics for all patterns stored in memory.
5. Press **A**, below the **Pattern Characteristics icon**, to return to the Pattern List screen when you have finished viewing Production statistics.



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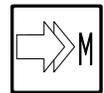
## Adding Multiple Patterns

Patterns stored on floppy disk or paper tape can be added to a pattern in memory using the Add option.

- The first pattern must be stored in memory.
- The second pattern is stored on floppy disk or paper tape.

The patterns are linked together so the second pattern begins where the first ends: the end point of the first pattern is the start point of the second. Therefore, Add should be used to combine patterns with compatible origins.

If you need movement between two patterns, use the Jog option.



Add Icon

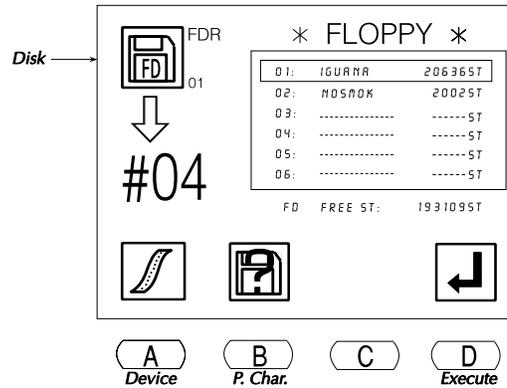
## Adding Patterns

1. Open the disk drive cover, and insert the disk. Or, prepare the tape reader and connect it to the BENS. See page 1-23 for instructions on connecting peripherals.



Read  
Softkey

2. Press the **Read softkey**. The floppy disk list displays, showing the patterns stored on disk.
3. The icon at the top left of the screen identifies the active device. If necessary, press **A** to select the device you are using to read the pattern. Pressing **A** toggles through the device options: Disk, Tape, COM and Jog.



4. If reading from floppy disk, use the **jog keys** to select the desired pattern from the floppy disk. If reading from paper tape, press **B**, if necessary, to select the correct **tape code**.
5. Press the **Memory softkey**. The Pattern list displays, showing the patterns stored in memory.
6. Use the **jog keys** to select the pattern stored in memory to which the pattern on floppy disk or paper tape will be added.
7. Press **C**, below the **Add icon**, to add the pattern from disk or tape to the selected pattern already in memory.

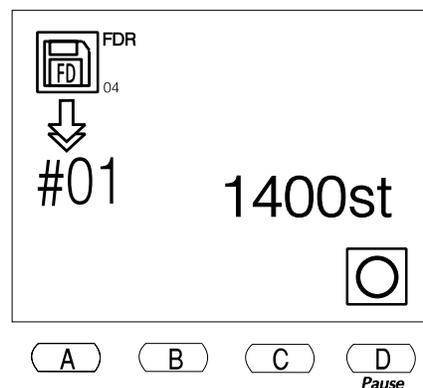
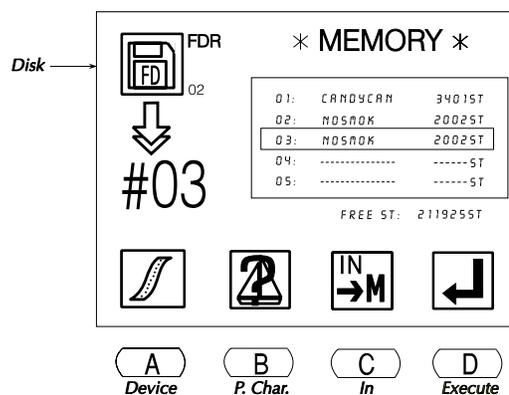
**NOTE: Add is only available when an occupied memory location is selected. When an empty location is selected, the Add icon is not displayed.**

8. Press **D**, below the **Execute icon**, to begin transferring to the selected memory location. To exit without adding to the pattern in memory, press the **Read softkey**. The display shows stitch count as the new pattern is sent to memory.

To stop the transfer, press **D**, below the **Pause icon**.

- Press **C**, below the **X icon**, to cancel the transfer.
- Press **D**, below the **O icon**, to continue the process.

When complete, the BENS beeps, and the basic screen displays.



## Merging Patterns with Movement



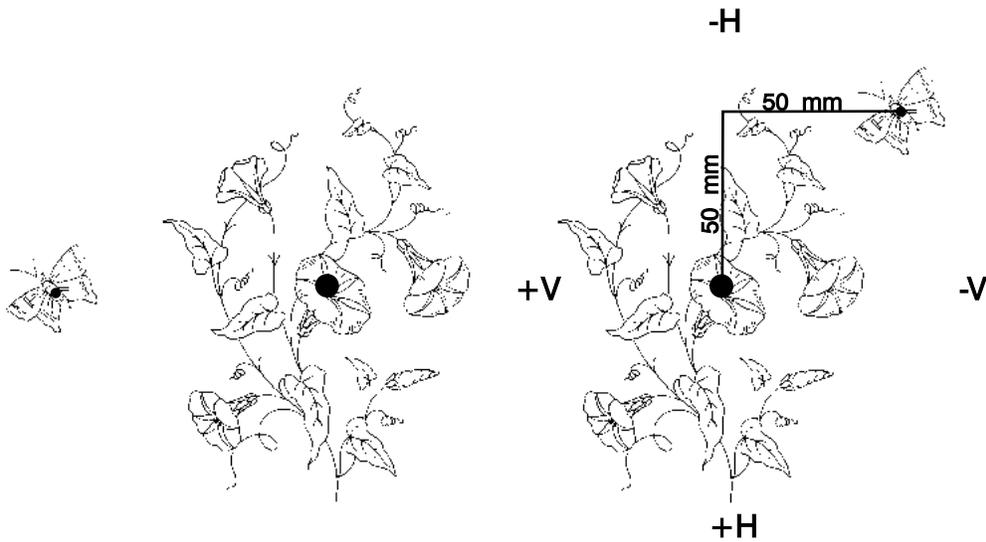
Jog Icon

In addition to adding patterns stored on disk or tape to an existing pattern, you can merge patterns already in memory, with movement between. Patterns are merged using the **Jog** option, the fourth device in the Read menu.

Patterns with common start (origin) and end points in the center of the pattern will sew on top of one another. Jog adds vertical and/or horizontal movement as patterns are merged, using jump stitches to move the pantograph to the position for the next pattern to begin. You can also choose to have stitches placed as the pantograph moves to the position for the next pattern.

Although this feature is executed from the Read menu, the patterns used must be stored in memory. You are reading in the movement between the patterns. Before merging patterns with Jog, make sure that:

- All patterns to be merged are already stored in memory
- An empty memory location is available to store merged patterns



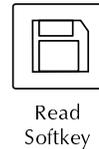
- There are sufficient free stitches in memory to store the combined total stitches of the merged patterns, plus the jump or walk stitches added between them
- You know the memory location numbers of the patterns to be merged because the Pattern List is not displayed during the merge process.
- You can merge as many patterns as desired, the only limit is space available in memory.

**NOTE:** If the source pattern was modified using Program options, the copied pattern keeps the modifications. See page 2-15 for details on the Program options.

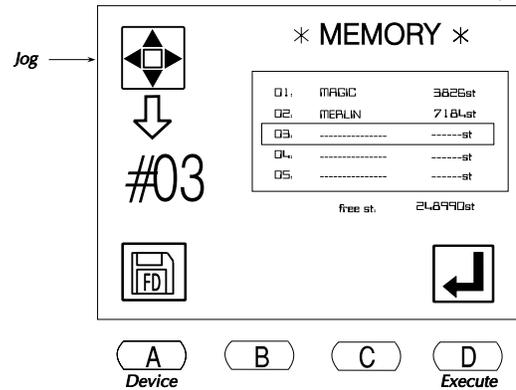


## Merging Patterns with Movement

1. Press the **Read softkey**. The floppy disk list displays. If there is no disk in the disk drive, and Disk was the last device used, **error A30** displays on the screen. Press any menu key to clear the message, then proceed with Step 2.



2. The icon at the top left of the screen identifies the active device. Press **A**, below the **Device icon**, until the **Jog icon** displays. The list of patterns in memory displays. The BENS automatically selects the next empty location. The location number on the left side of the screen flashes, indicating it is empty.



3. Press **D**, below the **Execute icon**. The Jog screen displays.

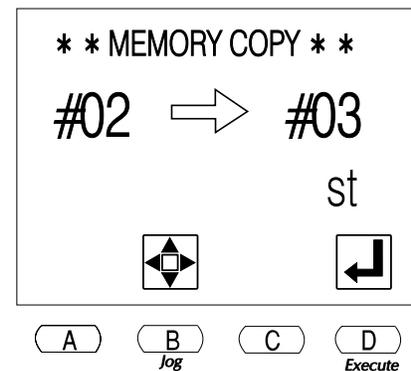
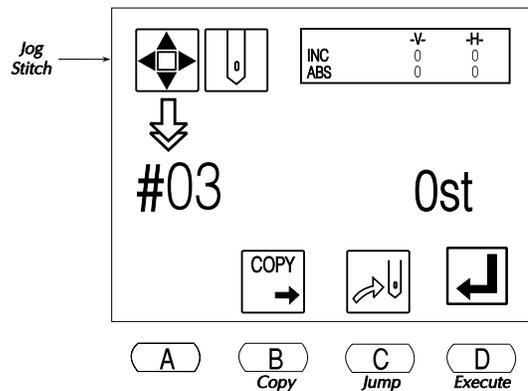
**NOTE: If desired, at the Jog screen you can add pantograph movement before the first pattern, changing its origin. Refer to Steps 8-10 in this section for instructions on adding movement.**

4. Press **B**, below the **Copy icon**. The Memory Copy screen displays.

- The location number on the **right** is the **destination**, the empty location that will store the merged patterns. This number should be flashing.
- The number on the **left** is the **source**, and changes as you use the jog keys to move through the list.

5. Use the **jog keys** to select the first pattern to be transferred to the empty memory location.

**NOTE: The pattern list is not displayed at this point.**



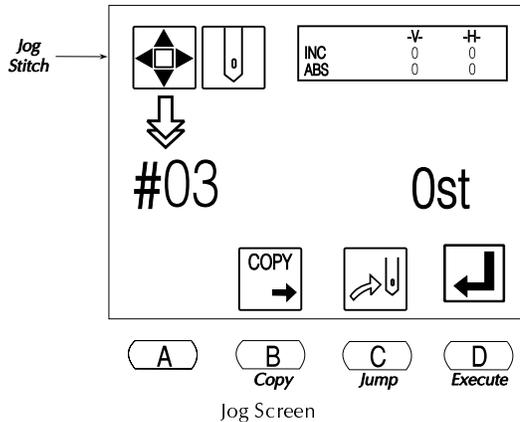
**Make sure you know the memory location numbers of the patterns you want to merge before beginning the process.**

- When the desired pattern number displays, press **D**, below the **Execute icon**, to begin copying. When complete, the BENS stays in Copy mode, so you can continue to add to the memory location.

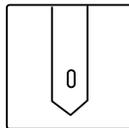
- Press **B**, below the **Jog icon** to return to the Jog screen. At this point, add the movement between the two patterns.

- The icon next to the Jog icon, indicates the **active movement type**. The default movement is jump jog.

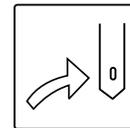
Press **C**, below the **Jump Jog icon**, to select the type of movement, walk stitches or jump stitches. Pressing C toggles between the two stitch types.



- Use the **jog keys** to move the pantograph the distance for the first movement. Use the H and V values shown on screen as a reference. See page 1-19 for an explanation of Incremental and Absolute values.



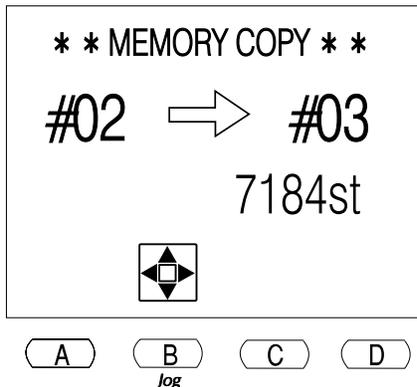
Stitch Jog



Jump Jog

- Press and **hold D**, below the **Execute icon**, until the BENS beeps once. The pantograph movement is added to the memory location. The screen shows that stitches have been added.

**NOTE: If you need the pantograph to move in a specific path, for example, over, then down, you must separately execute the movement in each direction. If not, the BENS moves using the shortest possible path.**



- Repeat Steps 9 and 10 to add the desired number of walk or jump stitches to the pattern, until the pantograph is in the desired position for the start of the second pattern.

12. When all movement has been added after the first pattern, press **B**, below the **Copy icon**. The Memory Copy screen displays.
13. Use the **jog keys** to select the second pattern in memory.

**NOTE: The pattern list is not displayed. Make sure you know the memory locations you want to use before starting.**

**Pressing B cancels Copy mode, returning to Jog mode.**

14. Press **D**, below the **Execute icon** to begin copying. When complete, the BENS stays in Copy mode, so you can add additional movement and patterns.

If desired, press **B**, below the **Jog icon**, to return to the Jog mode screen.

**NOTE: If Program parameter 4, Origin, is On, the BENS will return to the origin of the first design automatically. Refer to page 2-15 for information on Program parameters.**

**If you are not using Origin Return and you want the pantograph to return to the origin of the first pattern, you will need to enter a final jog movement and position the pantograph so that the H and V values are Ø.**

15. When all movement and patterns are added, press the **Read softkey** to exit Jog mode, returning to the basic screen.

Press the **Memory softkey** to see the Pattern List and verify the merged pattern stitch count. It should equal the total of all patterns added plus the total number of jump/walk stitches added.

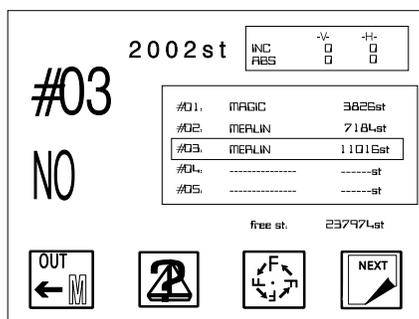
The BENS automatically gives the merged pattern the same name as the first pattern that was added. Use the Rename option to give the merged pattern a different name. See page 2-13 for instructions.



Read Softkey



Memory Softkey



**A**  
Out

**B**  
P. Char.

**C**  
Program

**D**

---

## Saving Patterns

Patterns are saved to disk, using the built-in floppy disk drive, or to peripheral devices, such as paper tape punchers. Sometimes, saving patterns is called “punching”. The term punch, dating back to early embroidery machines, refers to the method of saving patterns on paper tapes. The stitch data and function codes that made up a pattern were coded and punched on paper tapes. The tapes were read into the machine, which translated the information and sewed the design. While paper tapes are still used, embroidery technology has advanced to the use of floppy disks as the most common means of storing patterns.

The BENS punches patterns to paper tape in the following codes:

- U (Barudan)
- F (Fortron: ZSK, Melco)
- El (El-tac: Happy, Tajima)

Patterns can be saved to floppy disk in FDR format, using the internal disk drive as the device. You can also save to peripheral devices, such as tape punchers, using COM, the communication port, as the device.

**NOTE: The BENS only writes in FDR disk format. When saving to floppy disk, a code option is not displayed. Although the BENS reads disks in other industry formats, it only saves to disks in FDR format.**

Patterns can be modified with Program options before being saved. Program controls the pattern’s appearance as it is punched from memory. See page 2-15 for information on Program options.

## Saving to Floppy Disk

A pattern stored in the BENS internal memory can be saved (punched) to the built-in floppy disk drive.

**NOTE: The BENS can also save all patterns in memory to floppy disk with a single command. See page 2-31 for instructions on Memory Backup.**

---

### Saving to Disk

1. Press the **Memory softkey**. The pattern list displays, showing the patterns stored in memory.
2. Use the **jog keys** to select a pattern from the list. A box outline displays around the selected pattern.



Memory  
Softkey

3. Insert the floppy disk you are saving to in the disk drive. The disk should already be initialized in **FDR format**. See page 2-7 for instructions on initializing a disk.

4. Press **A**, below the **Memory Out icon**. The Output screen displays, showing the floppy disk list.

- If you did not insert a disk in Step 1, error A30 displays. Insert a floppy disk and press **D** to continue.

The BENS automatically locates the first empty location. If you want to save to a different location on the disk, use the jog keys to select it.

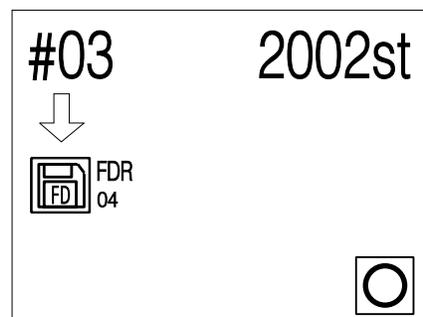
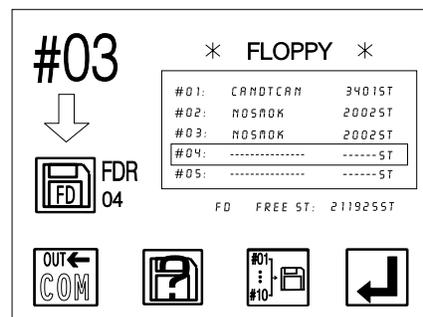
**NOTE: You cannot add to an existing pattern on disk, like you can to a pattern in memory. If you select an occupied location, the Execute icon is not displayed.**

5. Press **D**, below the **Execute icon**, to save the pattern to floppy disk. The display shows a count of the stitches as they are transferred.

- To stop transfer, press **D**, below the **Pause icon**. To resume the process, press **D** again.
- To cancel the command, press **C**, below the **X icon**.

When complete, the BENS beeps and the memory output screen displays, showing the Floppy List. The list should show the pattern you just saved to disk. It will have the same name it had in the memory Pattern List.

6. Press the **Memory softkey** to close the Memory Output screen, returning to the basic screen.



## Saving to Peripheral Devices

A pattern stored in memory can be saved (punched) to a device with a serial connection, using the communication port (COM). The following Barudan peripherals can be connected to the BENS: FDR-III, FDR-V, and UTP-III, as well as the Facit GNT. See page 1-23 for information on connecting peripherals.

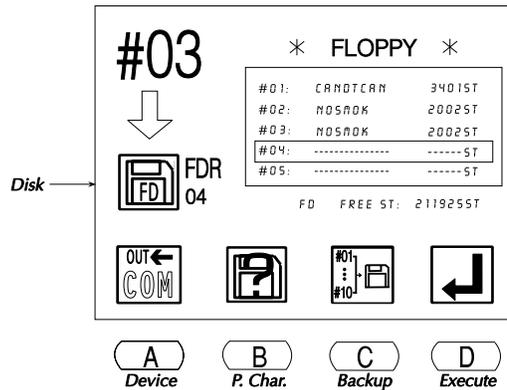
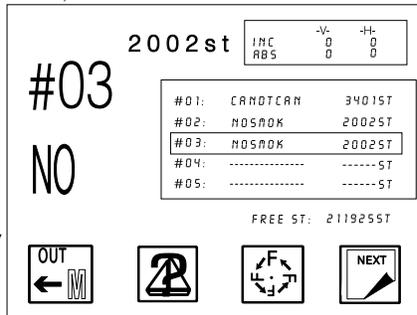
## Saving a Pattern Using COM

1. Press the **Memory softkey**. The pattern list displays, showing the patterns stored in memory.
2. Use the **jog keys** to select a pattern from the list. A box outline displays around the selected pattern.
3. Prepare the device according to its user's manual, and connect it to the BENS.
4. Press **A**, below the **Memory Out icon**.
5. The icon in the middle left of the screen identifies the active device. It should show the **COM icon**, indicating communication through the serial communication port.  
If this is not the current icon, press **A**, below the **Device icon**, to toggle the active device to the COM port. Pressing **A** toggles between the device options, Disk and COM.



Memory Softkey

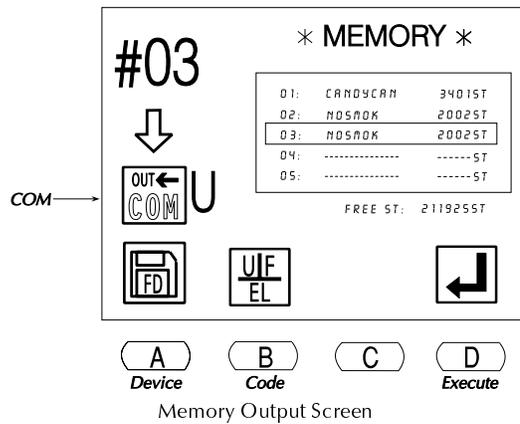
6. The letter to the right of the device icon at the middle left of the screen identifies the selected **tape code**.  
If necessary, press **B**, below the **Code icon**, to select the appropriate tape code. Pressing **B** toggles through the code options: U, F and El.



7. Press **D**, below the **Execute icon**, to begin transferring the pattern. The display shows a count of the stitches as they are transferred.

- To stop the transfer, press **D**, below the **Pause icon**. Press **D** again to resume the process.
- To cancel the command, press **C**, below the **X icon**.

When complete, the Memory Output screen displays. Press the **Memory softkey** to close the Memory Output screen, returning to the basic screen.



## Password Design Security

This function password protects your designs in memory. The Memory Out function is disabled unless password is entered.

### Setting up a Password

1. Power on NT.
2. Press Menu key until blank screen appears.
3. Press and hold A and C keys simultaneously for 5 seconds to set up a password. The *Password setup screen* will display.
4. Press the D key to continue. Press the B key to exit.
5. Enter a password using the jog keys to select a letter and the origin key to confirm. Same procedure as changing a design name. Continue until the all letters of the password are entered.
6. Press the C key and enter again to reconfirm.
7. Once the password is reconfirmed, press the D key to lock the design.
8. To exit, press the B key. Notice that no designs can be output. The Memory output option is crossed out.
9. To cancel the password you must press and hold the A and C keys simultaneously to enter the *password cancel display*.
10. Press the D key.
11. Enter the password and press the D key.
12. Press the B key to exit. All designs are free to be output from memory.

**NOTE: The password will be disabled when the memory is initialized.**

# Memory Backup

In addition to saving individual patterns to floppy disk, the BENS lets you copy all patterns stored in memory to a floppy disk, with a single command.



Memory Backup Icon

## Backing up Memory to Floppy Disk

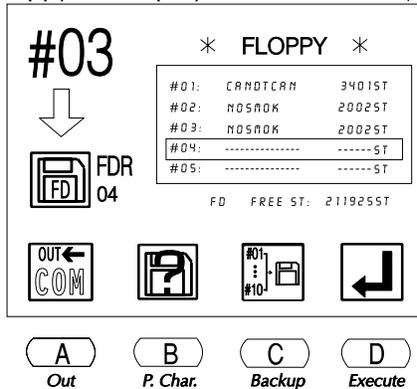
1. Press the **Memory softkey**. The pattern list displays, showing the patterns stored memory.
2. Press **A**, below the **Memory Out icon**. The Floppy list displays.



Memory Softkey

**NOTE: The icon in the middle left of the screen is the active device. If necessary, press A, below the Device icon, to select disk as the active device. The A key toggles between the device options, Disk and COM. Memory Backup is not available when COM is the active device.**

3. Press **C**, below the **Backup icon**. The Backup icon remains dark, showing it is active. The BENS automatically selects the first pattern in memory, even if a different one was previously selected, so all patterns in memory are saved to disk.



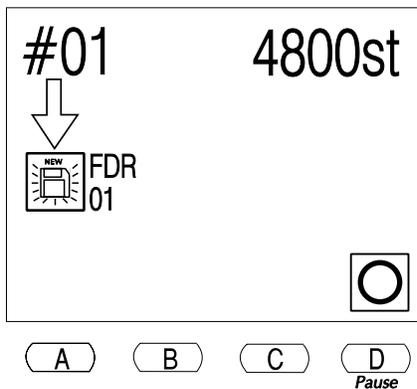
To cancel the backup command, press **C**, **Backup icon**, again, so the icon is not dark.

4. Press **D**, below the **Execute icon**. The BENS identifies the first available location on the disk and copies the first pattern in memory to it.

The display shows a count of stitches as they are transferred.

- To stop the transfer, press **D**, below the **Pause icon**. To resume, press **D** again.
- After pausing, press **C**, below the **X icon**, to cancel the command.

The BENS automatically continues the backup, copying the next pattern from memory to the next available location on the disk.



**NOTE: If there is not enough space on the floppy disk to store all patterns in memory, backup is stopped. The last pattern saved (incomplete) is automatically deleted from the floppy disk.**  
When complete, the BENS beeps and the basic screen displays.

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# Chapter 3

## Sewing

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## Sewing Controls

The BENS has several features that let you control the sewing action, such as where sewing begins, sewing speed, and the needle with which sewing begins.

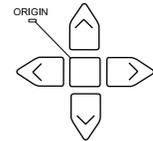
### Pantograph Positioning

When the machine is not sewing, the pantograph can be moved to the exact position you want sewing to begin. When the pantograph is moved, corresponding values display at the upper right of the LCD screen.

<b>H</b>	Represents up and down movement.
<b>V</b>	Represents left and right movement.
<b>INC</b>	Incremental movement, relative to the preceding stitch or preceding pantograph position, shown in H and V values - each time movement occurs, the values correspond.
<b>ABS</b>	Absolute movement from pattern origin or start point, shown in H and V values. After sewing a pattern, the ABS H and V values will be zero if the start and end points are the same.

### Jog Keys

The jog keys, four arrow keys on the automat, position the hoop by moving the pantograph under the needle. The arrows point in the opposite direction that the pantograph moves.



- Left and right movements correspond to the **V value** displayed on screen. Up and down movements correspond to the **H value** displayed on screen.
- Pressing two keys at the same time moves the pantograph diagonally. For example, if you press the left and up jog keys at the same time, the pantograph moves diagonally to the lower right.
- A brief touch on a jog key moves the pantograph 0.1mm in the opposite direction of the arrow on the key. Prolonged pressure on a jog key moves the pantograph continuously until the key is released.
- For more precise positioning, microfeed movement is available. Press the jog key once briefly, then quickly press again and hold it down. The pantograph moves continuously, but slowly.

Before beginning to sew, check that the needle position is correctly set for the start point of the pattern and that there is no danger of the needle running into the frame. Use Perimeter Trace to trace a box outline of the pattern. See page 3-7 for instructions.

## Sewing Speed Control

Before sewing, lower the speed. If tensions look good, slowly increase speed. Operation at too high a speed can cause fabric distortion and give poor results. Personal experience will be your best guide.

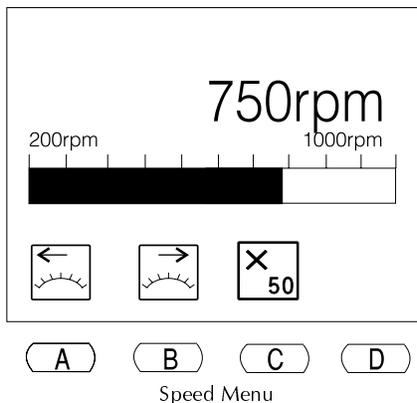


Speed  
Softkey

- Machine sewing speed is shown on screen in stitches per minute.
- Normal speed for best quality is from **500 to 750 stitches per minute**.
- When sewing on **finished caps**, normal speed is lower, usually **no more than 550 stitches per minute**.
- Speed can be changed at any time, before beginning or while the machine is sewing.
- A sudden change in speed while sewing will most likely cause a noticeable difference in stitch quality.

### Changing the Sewing Speed

1. Press the **Speed softkey** on the BENS automat. The Speed menu displays.
2. The current sewing speed is shown above the speed bar graph. Use the menu keys to change the speed as desired.
  - Press and hold **A**, below the **Decrease icon**, to decrease the sewing speed.
  - Press and hold **B**, below the **Increase icon**, to increase sewing speed.
  - Press **C**, below the **Increment of 50 icon**, together with **A**, to **decrease** the sewing speed by increments of 50 at a time.
  - Press **C**, below the **Increment of 50 icon**, together with **B**, to **increase** the sewing speed by increments of 50 at a time.
3. When you have completed changing the speed, simply wait a few seconds without pressing any menu keys. The speed menu fades, and the previous screen is displayed. Or, press the **Speed softkey** to immediately return to the previous screen.



## Needle Selection



Needle  
Softkey

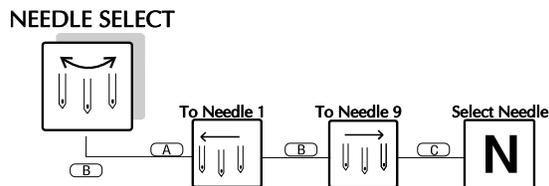
Before sewing, select the needle you want to begin sewing with, unless the pattern has a color change code programmed at the beginning. The needle can be changed any time that sewing is stopped.

**NOTE: If the BENS had been sewing with a different needle, then stopped, make sure you trim the thread before changing needles. See instructions on executing a manual trim.**

## Needle Selection Menu

There are two ways to select the desired needle.

- Needle by Needle with A & B keys, or,
- Selecting Direct Needle using N keys



### Needle Selection Using Needle by Needle Method

1. Press the **Needle softkey**. The needle selection menu displays.
2. Use the menu keys to select a needle.
  - Press **A**, below the **Toward Needle 1 icon**, to rotate to the needle to the left of the current needle.
  - Press **B**, below the **Toward Needle 9 icon**, to rotate to the needle to the right of the current needle.
  - **Hold down either A or B** to continue rotating the head in the indicated direction, until it is at needle 1 or needle 9.

The turret automatically turns in the direction indicated.

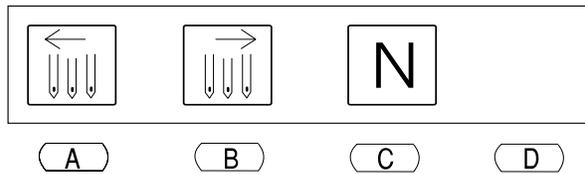
**NOTE: When you first power on the BENS, you must orient the machine to the correct position to rotate the turret. After following the steps above, the D14 message displays. Move the Start/Stop bar to the left to execute.**



Needle  
Softkey

### **Needle Selection Using Direct Needle Method**

1. Press the **Needle softkey**. The needle selection menu displays.



2. Press **C**, below the **Direct Needle** icon, to select the exact needle, **without** moving the head.
3. Press **A**, or **B** to until display shows the desired needle number.
4. Press **D**, below the **Execute** icon to move the head to the selected needle. The head automatically move in the direction needed.

**CAUTION! Never attempt to physically change colors when the power is OFF. Doing so will cause the head to bind and can cause extensive damage to the machine.**

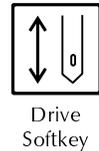
### **Fixing a YS/YN Head Bind**

1. Power on the machine.
2. Disengage all the thread keep solenoids by manually pulling the bar on the thread keep solenoids forward. Do this for each head.
3. Disengage all the heads, following the directions on page N Series Mechanical Guide.
4. Make sure the gang shaft is in its proper position by selecting a needle, as explained above.
5. If the gang shaft is out of position, the display will prompt you to start the machine by moving the Start/Stop bar to the left.

**CAUTION! If following these steps does not clear the bind, do not force it. Call your technician.**

## Sewing

Only patterns stored in the memory can be sewn. The following tools are used to sew a pattern.



## Drive Mode

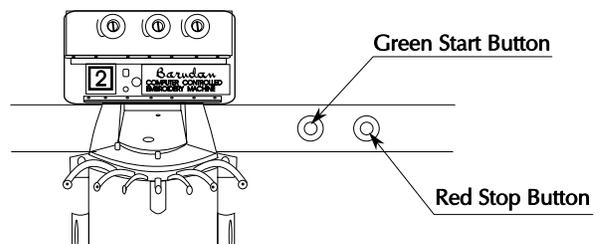
Sewing is done from Drive, the operational mode of the machine.

- Drive mode is entered by pressing the Drive softkey. The indicator light above the Drive softkey stops flashing and lights steadily when the machine is in Drive mode.
- Placing the machine in Drive mode also marks the **pattern origin**. This position is recorded and can be recalled using the Standby feature if power is shut off during sewing.

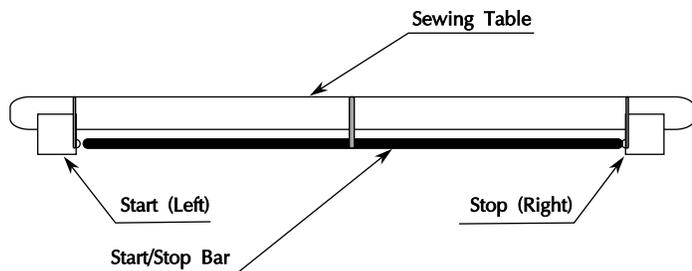
## Start/Stop Bar or Buttons

The Start/Stop bar or Start and Stop buttons are the devices that actually start and stop the sewing. Depending on the model, a machine has either the bar, or buttons.

- Cylinder bed models have Start and Stop buttons located between the heads.
- Flat bed models have a bar located under the sewing table.



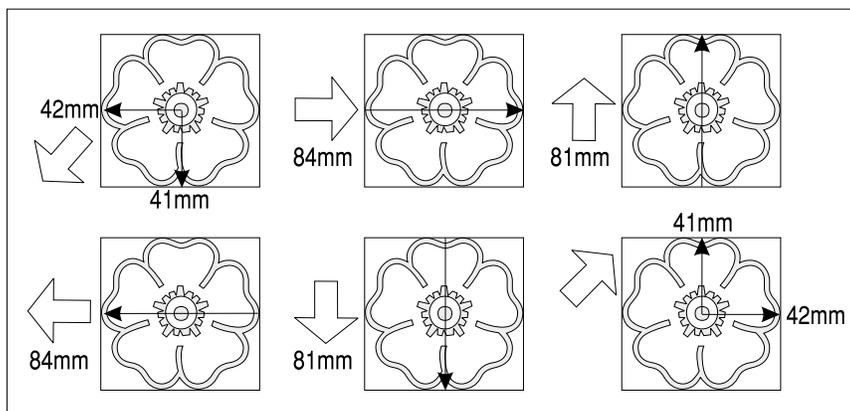
To begin sewing, move the **bar** to the **left** or push the **green Start button**. To stop sewing, move the **bar** to the **right** or push the **red Stop button**. Always stop sewing before turning the power off on the automat.



## Perimeter Trace



Perimeter Trace helps determine if the pantograph is at the correct position for the start point of the design, and if the design will sew in the correct place on the fabric. The Perimeter trace icon is shown on screen once the machine is in Drive mode.



Perimeter Trace moves the pantograph from the origin to the top right corner of the pattern, along the four sides of a box outline of the pattern, then back to origin. As the pantograph moves to each point, the display shows the distance moved, in millimeters.

**CAUTION!** If the pantograph moves beyond mechanical field limits during perimeter trace, the machine automatically shuts off. You'll need to manually push the pantograph back within the limits before powering on. At the Origin Set screen, you must press A for five seconds, to bypass seeking the origin. Seeking origin at this point would move back to the field limit, shutting off the machine again.

**NOTE:** Do not sew in this position. Exit Drive mode and use the jog keys to reposition the pantograph, changing the start point of the pattern, then re-enter Drive mode. Or, use Program options to make the pattern smaller.

**NOTE:** If you have set soft limits in the Machine Conditions parameters and position the start point of a pattern so it would hit a soft limit, when you use Perimeter Trace, the BENS recognizes that it will hit a limit, and does not move the pantograph in that direction during the trace. The BENS beeps and shows the D08 message, then continues on the rest of the trace. Each time it would hit a limit, it beeps and shows D08 again. When perimeter trace is complete D08 still displays, reminding you to

exit Drive and move the pantograph to a different start point. See the *Mechanical Guide* for information on soft limits.

### Sewing from Memory

1. Press the **Memory softkey**. The Pattern List displays.
2. Use the **jog keys** to select the pattern you want to sew.
3. Press the **Memory softkey** again to close the Pattern List.

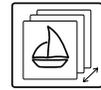
**NOTE:** You can also simply press the **origin key** (in the center of the jog keys) to close the list and move the pantograph to the start point (as recorded the last time that pattern was placed in Drive mode).

4. Use the **jog keys** to position the pantograph at the desired **start point** for the pattern.
5. Press the **Drive softkey**. The light above the key stops blinking and lights steadily, indicating that the machine is in Drive mode.
6. Press **D**, below the **Perimeter Trace icon**, to make sure that the pattern will be sewn in the desired position on the fabric.

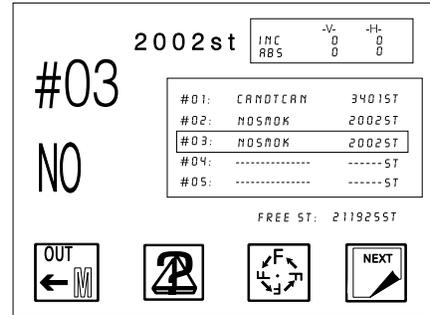
**CAUTION!** Make sure the needle is up, out of the fabric, before using perimeter trace, to prevent damage to the machine.

**NOTE:** If you need to change the pattern's start position at this point, you must exit the Drive mode. If you move the pantograph with the jog keys while in Drive mode, this movement is ignored. When you begin sewing, the pantograph moves back to the origin set when you entered Drive mode.

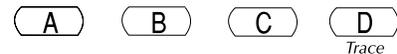
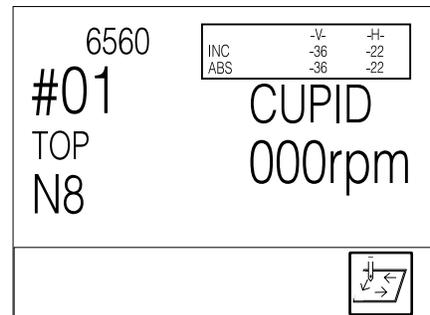
To exit Drive mode, press and hold the Drive softkey until the machine beeps and the Drive light is blinking. Then use the jog keys to move to the correct position, and press Drive again.



Memory Softkey



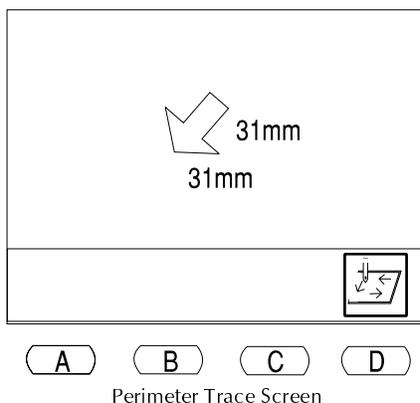
Drive Softkey



Drive Screen

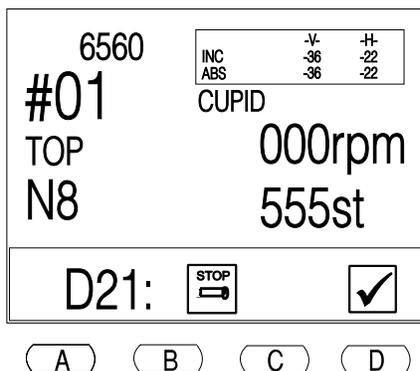
7. Move the **Start/Stop bar** to the **left** or press the **Start button** to begin sewing.
  - At times you may need to inspect the embroidery during sewing. When sewing is stopped, you can move within a pattern using the jog keys, do whatever is necessary, and **return to the last point sewn** by pressing the **Origin key**. The Origin key is used to move from the last point, to pattern origin, and back to the last point.

When finished sewing, exit Drive mode to access to the Read and Memory menu options.



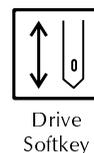
### Exiting the Drive Mode

1. Move the **Start/Stop bar** to the **right** or press the **Stop button** to stop sewing. The **D21** message flashes on screen, notifying you that the machine was stopped with the bar. To clear the message, press **D**, below the **Check icon**.
2. Press and **hold** the **Drive softkey** until the BENS stops beeping and the Drive indicator light begins to flash.



### Changing the Origin

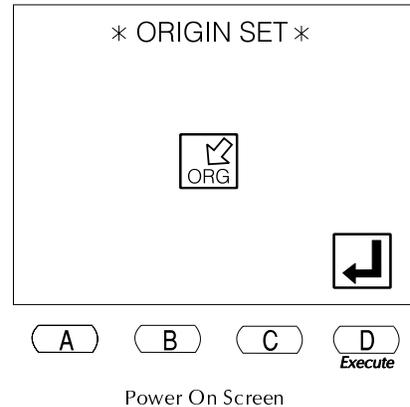
If necessary, you can move the pantograph while the machine is in Drive mode and start sewing from the new position, changing the pattern origin.



### Changing the Origin

1. If you were sewing, move the **Start/Stop bar** to the **right**, to stop.
2. Use the **jog keys** to move the pantograph to the new position.
3. Press and hold both **B and C** for approximately **5 seconds**.  
In the values box, the **ABS values are shown with a darker box**, letting you know the origin has changed.
4. Move the **Start/Stop bar** to the **left** or press the Start button to begin sewing at this point.

Note that the start point of the design will have been changed by the distance the pantograph was moved with the jog keys.

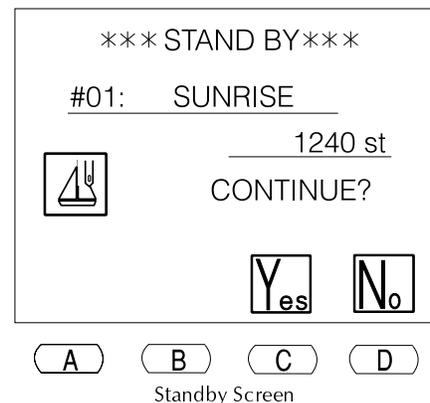


### Standby

Standby lets you resume operation of the machine when sewing at the time of a power failure or if the machine has been turned off before sewing was completed.

### Using Standby

1. Power on the BENS. The following screen displays.



**NOTE:** If the machine shut off because it moved beyond a frame limit, you will need to push the pantograph back within the limits before powering on. At the Origin Set screen, you must press A for five seconds to bypass seeking origin. Seeking origin at this point would move back to the frame limit, shutting off the machine again.

**NOTE:** If the machine shut off due to power failure, and the needle remained in the fabric, you will need to execute a manual thread trim, to raise the needle before moving the pantograph, to avoid damage to the machine.

2. Press **D**, below the **Execute icon**, to allow the machine to locate origin. The pantograph moves to machine origin, as determined by the origin sensor.

The Standby screen displays, showing the memory location and name of the pattern that was being sewn when power was shut off, as well as the number of the last stitch sewn.

3. Press **C**, below the **Yes icon**, to return to the position of the last stitch sewn. To cancel the Standby option, press **D**, below the **No icon**.
4. Move the **Start/Stop bar** to the **left** or press the **green Start button** to begin embroidering.

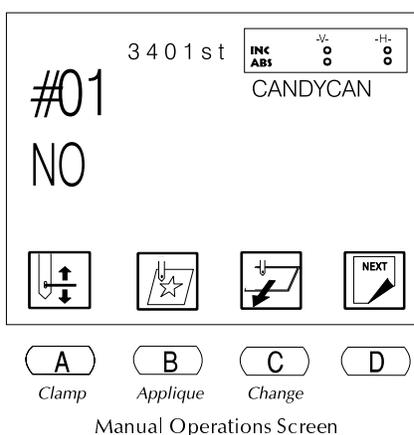
## Manual Operations



Manual Softkey

Manual operations are machine actions that can be executed at any time when sewing is stopped, before or during Drive mode. Manual operations include:

- Thread Clamp
- Appliqué
- Change Frame
- Thread Trim



Manual Operations Screen

## Thread Clamp



Thread Clamp opens the thread clamps, so sewing heads can easily be threaded.

### Using Thread Clamp

1. If you were sewing, move the **Start/Stop bar** to the **right** to stop.
2. Press the **Manual softkey**. The Manual menu displays.
3. Press **A**, below the **Thread Clamp icon**. The thread clamp on all active heads is released.
4. Press **A** again to move the clamps back in place once you are done threading.

5. Press the **Manual softkey** to exit the Manual menu.

## Appliqué



Appliqué rotates the main motor so the presser foot can be pressed down manually, to accurately position the frame or appliqué.

### Using Appliqué

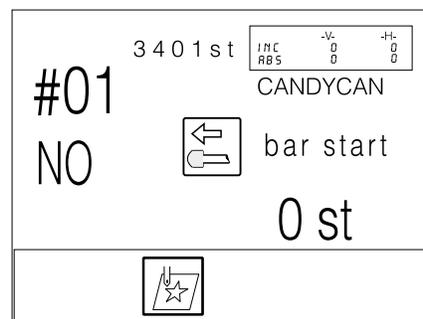
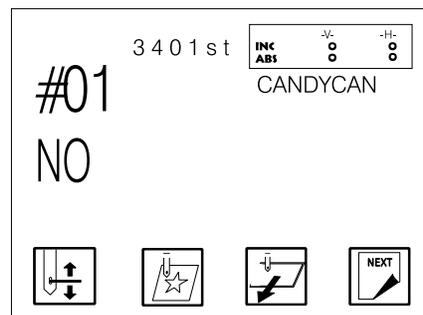
1. If you were sewing, move the **Start/Stop bar** to the **right** to stop.
2. Press the **Manual softkey**. The Manual menu displays.
3. Press **B**, below the **Appliqué icon**. The following screen displays, telling you to use the Start/Stop bar to execute.
4. Move the **Start/Stop bar** to the **left** or press the **green Start button**. The take-up lever of the current needle lowers.
5. Manually move the presser foot closer to the fabric.

**NOTE:** The presser foot can only be moved a set distance, as determined by MC parameter 18, Appliqué. If you need to move it closer, this parameter can be changed. See the *Mechanical Guide* for information on MC parameters.

6. Use the **jog keys** to move the pantograph, aligning it correctly for the start of the pattern or the appliqué position.
7. Move the **Start/Stop bar** to the **left** or press the **green Start button** to return the presser foot and take-up lever to the normal position.



Manual Softkey



## Change Frame



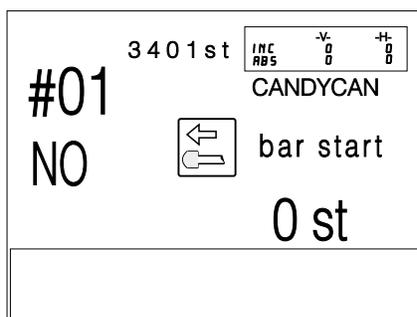
Change Frame moves the pantograph forward to allow framing or positioning of an appliqué. This movement, called frame offset, is automatically set at the pattern height. A different frame offset distance can be set for each pattern in the Program parameters. See page 2-15 for more information on Program.

### Using Change Frame

1. If you were sewing, move the **Start/Stop bar** to the **right** to stop.
2. Press the **Manual softkey**. The Manual menu displays.
3. Press **C**, below the **Change Frame icon**. The following screen displays, telling you to use the Start/Stop bar to execute.
4. Move the **Start/Stop bar** to the **left** or press the **green Start button**. The pantograph moves forward, by the height of the pattern, unless a different value was set in the program options.  
**NOTE: See page 2-15 for information on changing the distance moved.**
5. Once you have changed the frame or placed the appliqué fabric, move the **Start/Stop bar** to the **left** or press the **green Start button** to return the pantograph to its original position.



Manual Softkey

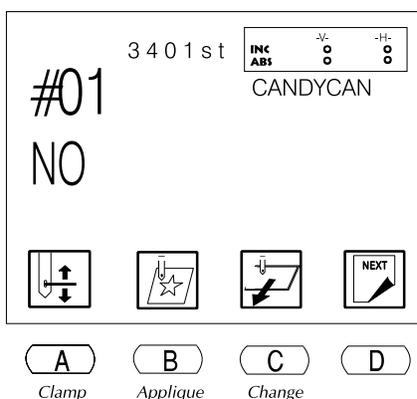


## Thread Trim



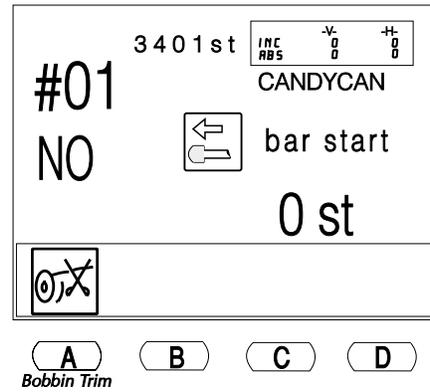
Trim Softkey

Thread Trim manually operates the trimmer to clean off trailing threads at any point in the pattern. When Thread Trim is selected, you also have the option of manually trimming only the bobbin thread.



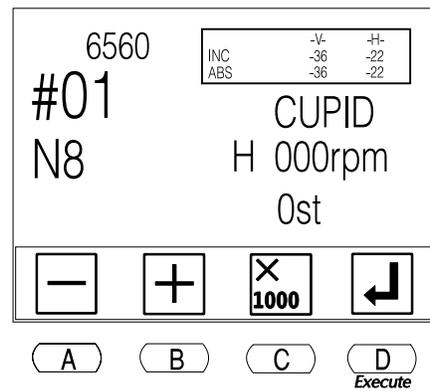
### Executing a Manual Thread Trim

1. If you were sewing, move the **Start/Stop bar** to the **right** to stop.
2. Press the **Thread Trim softkey**. The following screen displays, telling you to use the Start/Stop bar to execute.
3. At this time, you can execute only a bobbin trim, or a top thread trim.
  - Press **A**, below the **Bobbin Trim icon**, to execute a manual cut on only the bobbin threads. The icon displays with a darker box while it is executed. After using Bobbin Trim, the manual trim screen still displays, to let you also execute a normal trim.
  - Move the **Start/Stop bar** to the **left** or press the **green Start button** to execute the trim.



### Executing a Manual Trim From Any Sewing Head

1. Flip any head control switch off and on.
2. The LED's on all the heads will blink green on and off for three seconds. During this time, if the Start bar or is engaged, a manual trim will be performed on all heads. If the Start bar or green Start Button is not engaged, the machine returns to normal operation.



## Float



Float Softkey

Float advances the pantograph through a pattern without sewing. This is useful when you need to begin sewing within a pattern - not from the starting point.

### Manual Float

Used to move the pantograph through the pattern without sewing, usually when you do not know the exact stitch number.

**Digital Float** Used to begin sewing at a specific stitch. The pantograph moves directly to the stitch number selected.

**High Speed Float** Usually used when you know an exact stitch number, scrolls rapidly through stitches on the display. When, the pantograph moves directly to the stitch displayed.

**Color Change Float** Used together with the Teach softkey to move directly to the stitch number of a color function.

### Using Manual Float

1. Press the **Memory softkey**. The Pattern List displays.
2. Use the **jog keys** to select the desired pattern.
3. Press the **Drive softkey**. The light above the key lights steadily, showing that the machine is in Drive mode, ready to sew.
4. Press the **Float softkey**. The Float menu displays. The light above the Float softkey is on, indicating Float mode is active.
5. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to begin floating. As the pantograph advances, the display shows the stitch number.
6. When the pantograph reaches the desired stitch, move the **Start/Stop bar** to the **right** or press the **red Stop button**, to stop. The display reflects the new stitch count location.
7. To begin sewing from this stitch, press the **Float softkey** to exit Float mode, then move the **Start/Stop bar** to the **left** to begin sewing.



Drive Softkey



Float Softkey

### Using Digital Float

1. Press the **Memory softkey**. The Pattern List displays.
2. Use the **jog keys** to select the desired pattern.
3. Press the **Drive softkey**. The light above the key is on, showing that the machine is in Drive mode, ready to sew.
4. Press the **Float softkey**. The Float menu displays. The light above the Float softkey is on, indicating Float mode is active.
5. Use the menu keys to move to the desired stitch. The lowest line of the LCD screen, immediately above the row of icons, shows the current stitch location.
  - Press **A**, below the **minus icon**, to move **backward** in the pattern one stitch at a time, from the current stitch.



Memory Softkey



Float Softkey

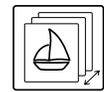
- Press **B**, below the **plus icon**, to move **forward** in the pattern one stitch at a time, from the current stitch.
- To move **rapidly** through the stitches, one stitch at a time, press and hold either **A** or **B** to move in the required direction.
- Press **C**, together with either **A** or **B**, to move backward or forward in increments of 1000 stitches.

Only the stitch number on the display is changed.

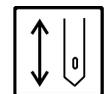
6. When the display shows the desired stitch number, press **D**, below the **Execute icon**, to move the pantograph to the indicated stitch.
7. When the pantograph is at the correct position and the display shows the desired stitch number, press the **Float softkey** to exit Float mode, returning to Drive mode.
8. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to begin sewing from this stitch.

### Using High Speed Float

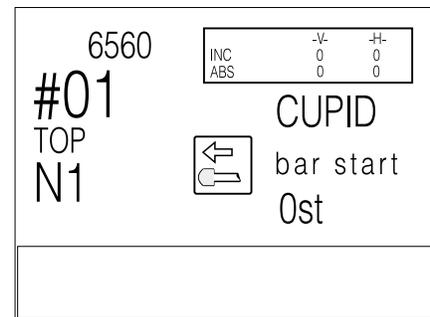
1. Press the **Memory softkey**. The Pattern List displays.
2. Use the **jog keys** to select the desired pattern.
3. Press the **Drive softkey**. The light above the key is on, showing the machine is in Drive mode, ready to sew.
4. Press and **hold** the **Float softkey** until the BENS beeps. The light above the Float key is flashing, indicating that High Speed Float is active. The following screen displays, telling you to use the Start/Stop bar.
5. Move the **Start/Stop bar** to the **left** or press the **green Start Button**.  
On the screen, the BENS advances through the stitches in the pattern. Only the stitch count on the display changes at this time.
6. Before it reaches the desired stitch number, move the **Start/Stop bar** to the **right** to stop advancing. The pantograph moves to that stitch.



Memory Softkey



Drive Softkey



**NOTE: High speed float is not recommended for reaching a specific stitch.**

7. Press the **Float softkey** to exit the Float mode, returning to Drive mode.



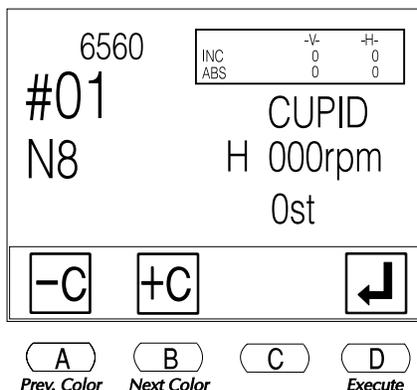
8. Move the **Start/Stop bar** to the **left** to begin sewing or press the **green Start Button**.

### Using Color Change Float

1. Press the **Memory softkey**. The Pattern List displays.
2. Use the **jog keys** to select the desired pattern.
3. Press the **Drive softkey**. The light above the key lights steadily, showing that the machine is now in Drive mode, ready to sew the selected pattern.
4. Press the **Float softkey**. The Float menu displays. The light above the Float softkey is on, indicating that Float mode is active.
5. Press the **Teach softkey**. The Teach menu displays.
6. Use the menu keys to move to the desired stitch, using the color change codes.
  - Press **A**, below the **Prev. Color icon**, to move backward to the color change before the current stitch.
  - Press **B**, below the **Next Color icon**, to move forward to the color change after the current stitch.
7. When the desired stitch number is displayed, press **D**, below the **Execute icon**, to move to the selected stitch.
8. Press the **Float softkey** to exit the Float mode.
9. Press the **Teach softkey** to exit the Teach mode.
10. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to begin sewing from this stitch.



Teach Softkey



### Teach

The Teach option is an easy way to change the function codes in the pattern. There are two ways to Teach:

- |                       |   |
|-----------------------|---|
| <b>Display Method</b> | Change function codes and view them on the display before sewing. |
|-----------------------|---|



Teach Softkey

## Sewing Method

Change function codes as a pattern is sewn. A variation of this method lets you insert new function codes in the pattern.

When you select Teach, you can choose to quickly locate and change only the color codes, or stop at all function codes. The following table shows function codes recognized by the BENS, so you can change or insert the ones you need.

## Function Codes

FUNCTION CODES		
NUMBER	FUNCTION	DISPLAYED AS
Ø	None	Ø
1	Jump	1 (JP)
2	Slop Speed	2 (L)
3	Slow Jump	3 (LJ)
4	High Speed	4 (H)
5	High Speed Jump	5 (HJ)
6	Top Thread Trim	6 (T1)
7	Bottom Thread Trim	7 (T2)
8	Stop	8 (CØ)
9	Needle 1	9 (C1)
10	Needle 2	10 (C2)
11	Needle 3	11 (C3)
12	Needle 4	12 (C4)
13	Needle 5	13 (C5)
14	Needle 6	14 (C6)
15	Needle 7	15 (C7)
16	Needle 8	16 (C8)
17	Needle 9	17 (C9)
18	Needle 10	18 (C10)
18	Needle 11	18 (C11)
18	Needle 12	18 (C12)
18	Needle 13	18 (C13)
18	Needle 14	18 (C14)

FUNCTION CODES		
NUMBER	FUNCTION	DISPLAYED AS
18	Needle 15	18 (C15)
19	Group 1	(G1)
20	Group 2	(G2)
23	Sub End	23 (SE)

NOTE: As you change the color sequence, you are changing the original function codes in the pattern. If you do not want to change the original pattern, note the changes in case you want to return to original colors. The best safeguard is to make a **backup copy** of the pattern. See page 2-27 for instructions on saving the pattern to floppy disk.

## Display Method

Use the display method to change existing function codes on the display before beginning to sew the pattern.

### Changing Colors on the Display with Teach

1. Select a pattern. Press the **Memory softkey** and use the **jog keys** to move through the pattern list.
2. Press the **Teach softkey**, to Teach **only color codes**.

*or*

Press and **hold** the **Teach softkey** for approximately three seconds, to Teach **all function codes**. The Teach screen displays.

**NOTE: The screen appears slightly different if you held down the Teach softkey to select all function codes. The icons F- and F+ display, instead of the C- and C+ icons.**

3. Press **D**, below the **Execute icon** to move to the first color or function code in the pattern.

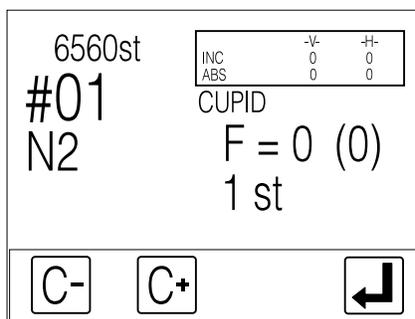
The Teach screen shows the stitch number where the code is located and current function code. The current code is flashing. The number in parentheses indicates the corresponding color code/needle number.



Memory Softkey



Teach Softkey



**A**  
Prev. Color

**B**  
Next Color

**C**

**D**  
Execute

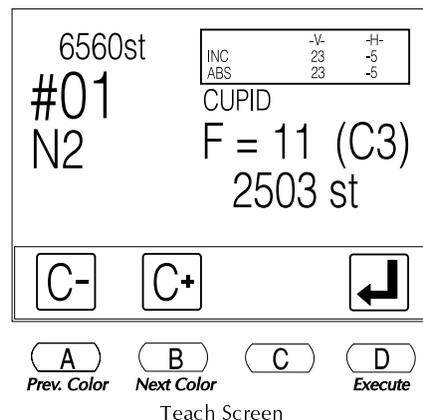
4. Use the menu keys to change the code as desired.
  - Press **A**, below the **Previous Color icon**, to select the code before the flashing code.
  - Press **B**, below the **Next Color icon**, to select the code after the flashing code.

**NOTE: Available codes correspond to the way Teach was selected. If Teach was held for three seconds, all function codes are available. If Teach was pressed once, only color codes are available. See the table on page 3-17 for a list of function codes.**

5. When the desired code is displayed, press **D**, below the **Execute icon**, to accept the change and move to the next code in the pattern.
6. Repeat Steps 4 and 5 to move through all codes in the pattern.

**NOTE: If you don't need to change additional codes, press the Teach softkey after making the last change, to exit the Teach menu. Changes made in Teach are accepted even if you do not advance all the way to the end of a pattern.**

The BENS beeps when there are no more codes in the pattern.



## Sewing Method

Use the sewing method to change existing function codes while a pattern is sewing. When teach is activated in Drive mode, the machine sews the pattern, stopping at each code instead of executing it, so you can change the code if necessary.

### Changing Colors while Sewing with Teach

1. Press the **Memory softkey** and use the **jog keys** to move through the pattern list. Select a pattern.
2. Press the **Memory softkey** to close the pattern list.
3. Press the **Drive softkey**. The light above the key is on, indicating the machine is in Drive mode, ready to sew.
4. Press the **Teach softkey**, to Teach **color codes only**. The light above Teach is on, indicating Teach is active.



Memory Softkey

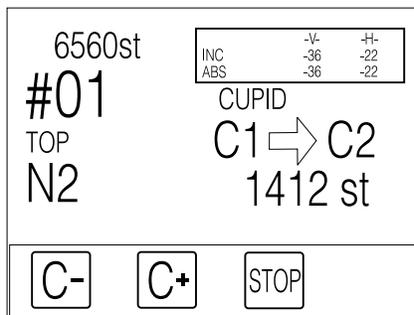


Drive Softkey

5. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to begin sewing.

When the machine reaches the first code, sewing stops and the Teach screen displays.

The Teach screen shows the stitch number where the code is located. The code to the left of the arrow is the current function code. The flashing code to the right of the arrow indicates the new code that will be assigned.



6. Use the menu keys to change the code as desired.

- Press **A**, below the **Previous Color icon** to select the code before the flashing code.
- Press **B**, below the **Next Color icon** to select the code after the flashing code.
- Press **C**, below the **Stop icon**, to insert a stop code (CØ).

The sewing head immediately rotates in the direction indicated when a new color code is selected.

7. When the desired code is set, move the **Start/Stop bar** to the **left** or press the **green Start Button** to continue sewing the pattern.

The machine stops at each subsequent code in the pattern. Repeat Steps 5 and 6 to change the function codes through the entire pattern.



Teach While Sewing Screen

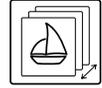
## Insert A New Code

Occasionally, you may need to insert additional function codes in a pattern. A new code can be inserted by sewing normally up to the desired stitch, stopping the machine, then selecting Teach to enter a code.

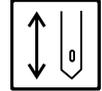
- The new code is executed the next time the pattern is sewn.
- To make the new code take effect in the current run of the pattern, after inserting, manually execute a trim and needle change. You can also Float backwards a few stitches and, when you start sewing again, the machine automatically executes the new color change.
- If you know the necessary stitch numbers, you can also insert all new codes with the machine in Float mode.

## Inserting a New Function Code with Teach While Sewing

1. Select a pattern. Press the **Memory softkey** and use the **jog keys** to move through the pattern list.
2. Press the **Memory softkey** again, to close the pattern list.
3. Press the **Drive softkey**. The light above the key is on, indicating the machine is in Drive mode, ready to sew.
4. Move the **Start/Stop bar** to the **left** or press the green Start Button to begin sewing.
5. When the BENS reaches the stitch where you want to insert a function code, move the **Start/Stop bar** to the **right** or press the **red Stop button** to stop sewing.
6. **Hold down** the **Teach softkey** for approximately three seconds, until the BENS beeps.



Memory Softkey



Drive Softkey

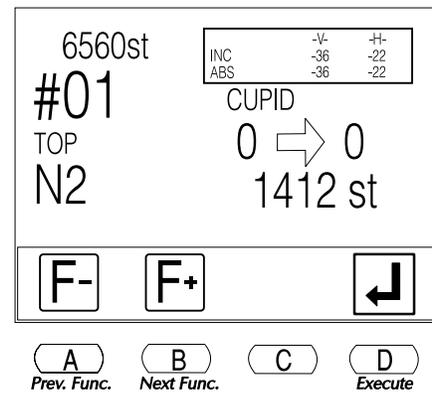


Teach Softkey

The Teach screen displays, showing the current stitch number. Above the current stitch number, the code to the left of the arrow is the current function code.

A zero displays, indicating that a function is not currently assigned to this stitch. The flashing code to the right of the arrow indicates the new code that will be assigned.

7. Use the menu keys to change the code as desired.
  - Press **A**, below the **Previous Function icon**, to select the code before the flashing code.
  - Press **B**, below the **Next Function icon**, to select the code after the flashing code.



A dark box displays behind the code to the right of the arrow, indicating that it is being changed from the original.

**NOTE: See page 3-17 for a list of function codes.**

8. When the desired code displays, press **D**, below the **Execute icon**, to save the new function code. The BENS beeps, and the dark box no longer displays behind the changed code.
9. Press the **Teach softkey** to exit the Teach screen.

**NOTE: The newly inserted code will be executed the next time the pattern is sewn.**

If you want to execute the new code during this sewing of the pattern, use the manual operations to trim the thread and change to the new needle, before or after inserting the code with Teach. You can also use Float to back up a few stitches, then let the machine automatically execute the code.

10. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to continue sewing the pattern.

---

## Repairing Missed Stitches

There are two methods for backing up the machine to repair a missed stitch, **Stitchback** and **Automend**.

Both move the pantograph backward through the stitches. In **Stitchback**, all heads sew from the backup point. When the machine is restarted in **Automend**, only the selected head sews up to the stopping point is reached; then, all heads resume sewing. Both functions have a back up limit of **1600 stitches**. If you need to backup further than 1600 stitches, use **Float**. See page 3-14 for information on **Float**.

An additional repair method, **Temporary Repair Stop**, lets you recover a large section of stitches missed on only one head in the next run of the design.

### Stitchback

**Stitchback** repairs the stitches on all active sewing heads.

- To reverse the pantograph, stop the machine and move the **Start/Stop bar** to the **right**, holding it there until the machine has backed up to the required position, then let go of the bar.
- Move the **Start/Stop bar** to the **left** to begin sewing from the position the pantograph was backed up to.

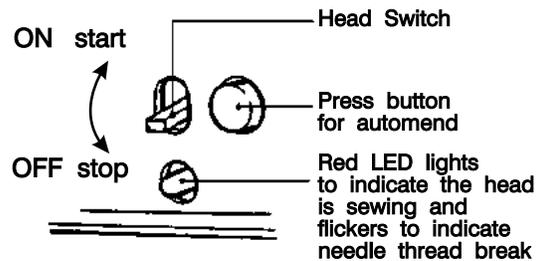
All the heads sew when the machine starts to embroider forward again, including those where embroidery is already satisfactory. The machine stops again when it reaches the point where **stitchback** began.

To allow the pantograph to reverse automatically, move the **Start/Stop bar** to the right, hold it there for approximately 10 stitches, then release. The pantograph continues to back up (to the limit of 1600 stitches) until you move the **Start/Stop bar** to the right again to stop.

## Automend

Automend repairs stitches missed by only one head but not the others.

- Press the **Automend button**, located on the front of the head, on the head concerned. See the illustration above. Keep pressing the button until you reach the point required, then move the **Start/Stop bar to the left** to begin sewing. Only the head doing the repair embroiders, other heads do not sew. When the machine reaches the point where backup began, it stops. Move the **Start/Stop bar to the left**, all heads continue sewing.
- You can also **automend several heads** at once. Once backed up to the required position using the automend button on one of the heads, press the **Automend buttons** on the other heads needed. Their lights will turn on. When you move the Start/Stop bar, only the heads with the lights on will sew up to the point of reversal.
- It is also possible to automend several heads by moving the **Start/Stop bar to the right** holding it there until the machine backs up to the desired point. Lower the switches on the front of the heads where embroidery is satisfactory. Only heads with the switches lifted sew when you move the Start/Stop bar to the left.



**NOTE: Automend identifies any needle changes in the backup and automatically executes them.**

The BENS also has an automatic Automend feature. When a thread break occurs, the machine stops and automatically backs up a certain number of stitches.

**NOTE: Unless it is turned off, MC parameter 13, Auto Start, automatically starts all heads without the operator moving the Start/Stop bar when it returns to the point where Automend began. See the *Mechanical Guide* for information on MC parameters.**

**NOTE: Both Automend and Stitchback function after using High Speed and Digital Float or when the machine is powered up after Standby.**

## Temporary Repair Stops

The temporary repair stop feature lets you insert a marker in the pattern at any stitch number. This feature is used in the following situation.

- When sewing, you notice that the embroidery on one head is unsatisfactory (maybe due to running out of bobbin or poor tension). At this time, you do not wish to stop and automend that head (perhaps it is necessary to pull out some stitches on that garment). Instead, you want to turn off the affected head, then complete sewing on that garment during the next run of the pattern.
- When sewing is stopped, the BENS lets you insert a temporary repair stop marker in the pattern at the stitch where you want to turn a sewing head back on in the next run of the pattern.

You can insert **up to 10** temporary repair stop markers in each run of the pattern, for any additional heads that may need to be turned off.

### Using Temporary Repair Stops

1. When the machine is sewing and you notice the work on one head is bad, move the **Start/Stop bar** to the **right** or press the **red Stop button** to stop sewing.

The D21 message displays, telling you sewing was stopped with the bar.

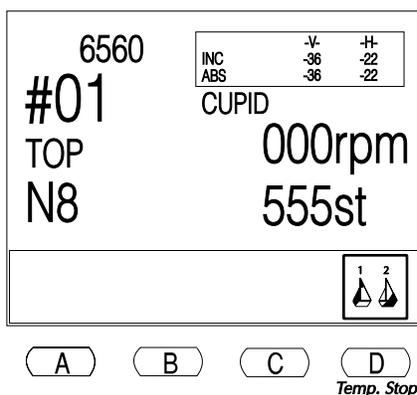
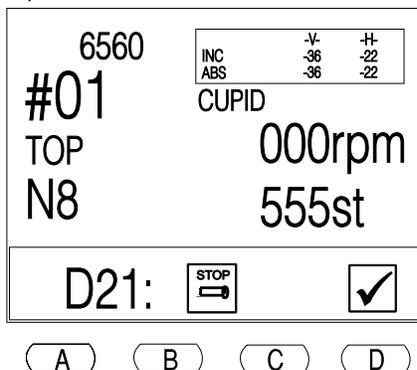
2. Press **D**, below the **Check icon** to clear the message.

The following screen displays, showing the Temporary Stop icon.

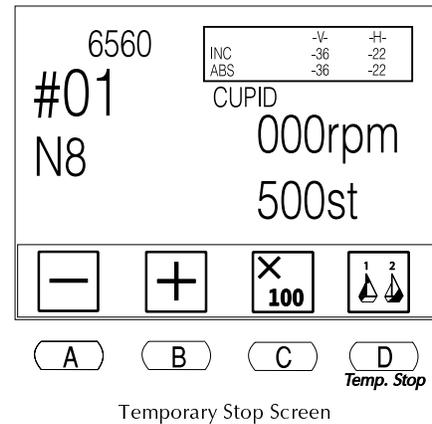
3. Press and **hold D**, below the **Temporary Stop icon**, for approximately 3 seconds, until the BENS beeps twice. The following screen displays.

4. Use the menu keys to back up a few stitches (as many as necessary) to the stitch number where you will want to resume sewing on this head in the next run of the pattern.

- Press **A**, below the **Minus icon**, to move **backward** in the pattern one stitch at a time, from the current stitch.



- Press **B**, below the **Plus icon**, to move **forward** in the pattern (if you backed up too far), one stitch at a time, from the current stitch.
- To move **rapidly** through the stitches, one stitch at a time, press and **hold** either **A** or **B** to move in the required direction.
- Press **C**, together with either **A** or **B**, to move backward or forward in increments of 100 stitches.



The changed stitch number flashes on the display.

**NOTE: You MUST change the stitch number to one lower than the original stitch number where sewing was stopped. If you do not, the temporary repair stop will not register.**

5. When the desired stitch number is shown, press **D**, below the **Temporary Stop icon**, to enter the stop mark. The BENS beeps twice and the display returns to the normal Drive screen, showing the original stitch number where sewing was stopped.
6. Manually **turn off the head** where sewing was unsatisfactory. See the *Mechanical Guide* for instructions on turning off a head.
7. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to continue sewing the pattern on all other heads.
8. Repeat Steps 1-7, if necessary, to insert additional temporary repair stop markers in the pattern. Up to **ten** temporary stops can be inserted in each run of the pattern.

**NOTE: If you insert more than one temporary repair stop in a run, you may want to keep a record of the sewing head that each mark pertains to. The second temporary repair stop marker inserted in a run must be at a higher stitch number than the first.**

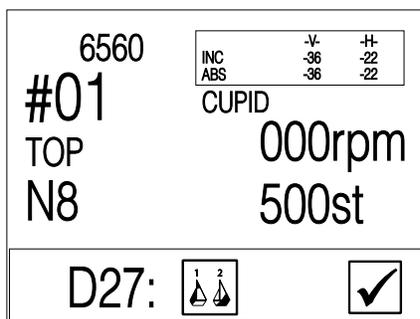
9. When this run of the pattern is complete, remove the garments from all sewing heads that completed the pattern. Leave the garments on the heads that were turned off.
  - **Do not exit Drive mode.** If you do, the temporary repair stop markers are deleted.

Place new garments on the other heads, then begin sewing the next run of the pattern.

When the machine reaches the first temporary stop marker in the pattern, it stops sewing and displays the D27 message.

10. Press **D**, below the **Check icon**, to clear the message.
11. Turn on the head that was canceled in the previous run of the pattern.
12. Move the **Start/Stop bar** to the **left** or press the **green Start Button** to continue sewing.

If sewing is unsatisfactory on one of the heads in this run of the pattern, you may insert temporary stops. The BENS keeps track of stops inserted in the previous run, and stops that pertain to the next run.



- (A) (B) (C) (D)

---

# **Chapter 4**

## **Error Codes**

## Error Codes and Display Prompts

The chart on the following pages explains the various prompts displayed during operation and guides you through performing the appropriate action. The chart includes error codes and the steps necessary to correct machine malfunctions.

ERROR CODES		
DISPLAYED	MEANING	ACTION REQUIRED
	<b>A02</b> Unable to Operate During Sewing	MC parameters cannot be changed during sewing. Stop the machine with the Start/Stop bar then access MC.
	<b>A04</b> Unable to Use a Reader	Tape reader is not on or operator did not follow correct sequence in preparing the reader. Make sure the tape reader is turned on and that you follow the correct sequence to prepare the reader given in its user manual.
	<b>A05</b> Tape Code Error	Wrong code selected, or tape loaded in reader incorrectly. Verify the tape code to be used and use the menu keys to select the correct code.
		Make sure the tape was correctly loaded on the reader. Refer to the device's user's manual.
		
	<b>A08</b> Disk Full Terminate Writing	Not enough free stitches available in memory. Copy pattern(s) to disk then delete from memory to free the necessary number of stitches.
	<b>A11</b> COM is Not Connected	Indicates that the COM port is off. Turn on peripheral device connected to the COM port. Check the COM connection to make sure the cable isn't loose.

	DISPLAYED	MEANING	ACTION REQUIRED
	 A20 No Design in this Memory	An empty memory location has been chosen when using punch.	Verify the memory location number of the pattern to be punched.
	 A21 All Memory Empty	Nothing stored in machine memory	None. You will need to load a pattern into memory in order to sew.
	 A22 Add to Memory (BENR only)	When reading a pattern into memory, an occupied location was selected. Do you want to add to the existing pattern?	Select <b>Yes</b> to add to the existing pattern. Or, select <b>No</b> to cancel reading, so you can select a different memory location.
	 A23 Overwrite Memory Location (BENR only)	When reading into memory, you selected an occupied location and pressed the New icon, to overwrite the old pattern.	Select <b>Yes</b> to confirm that the old pattern will be deleted as the new one is read into memory. To cancel, select <b>No</b> .
	 A24 Unable to Find Next Color Change	The last color change code in the pattern has been reached.	None. See the <i>Operation Guide</i> for information on teaching color changes.
	 A26 No Movement for Sewing Socks	The origin for the second design being sewn in the frame was not set before the Start/Stop bar was moved to begin sewing.	Use the jog keys to set the second pattern origin. See the <i>Mechanical Guide</i> for instructions.
	 A27 Unable to Find Next Function	The last function code in the pattern has been reached.	None. See the <i>Operation Guide</i> for more information on changing function codes.
	 A28 Calculating. Please Wait.	The system is making calculations needed to execute a command.	None.
	 A29 The Memory Pattern Number is Full.	All memory locations are occupied.	Delete patterns from memory to make room for new.

	DISPLAYED	MEANING	ACTION REQUIRED
	A30 Disk Not Mounted	The disk has not been placed in the floppy disk drive.	Insert a disk in the floppy disk drive, then re-execute the command.
	A31 Write Protected	The disk is write protected, or you are saving to a disk in a format other than FDR.	Disarm write protection by sliding the tab on the disk. Make sure the disk is in FDR format.
	A32 Error on Reading & Writing (Floppy)	The drive cannot read or write to the disk inserted in the disk drive.	If trying to read a disk, make sure it is a format read by the machine. See the <i>Operation Guide</i> for compatible disk formats. If trying to write to disk, it must be in FDR format. Insert a FDR disk.
	A33 File Full	The floppy disk contains 36 patterns.	Delete patterns from the disk, making room for new, or insert a new disk with available memory locations.
	A35 SF Enabled	When MC #29 SF = On, and Perimeter Trace or Origin Key are selected.	You cannot use Perimeter Trace or Origin Key when Spectacle Frame option is turned on.
	A36 Appliqué Enabled	When sewing appliqué with Manual Operation and Origin Key is selected.	You cannot use Origin Key when using Appliqué in Manual Operation.
	D01 Needle Bar Not Locked	Needle bar is not locked.	Move color change manually to set the needle bar.
	D02 Manual Operation	While in MC parameters, the machine will not sew.	Exit MC, then move the Start/Stop bar to the left to begin sewing.
	D03 Needle Bar Lock	Needle bar is not properly engaged.	Move color change manually to set the needle bar.

	DISPLAYED	MEANING	ACTION REQUIRED
	D04 Needle Bar Positioner	Machine cannot locate the next needle during a color change.	Probably an error with the color change board. Call your technician.
	D05 Unable to Color Change	Machine is not able to color change.	Either the thread keep solenoids are stuck, the jump stitch solenoid is not engaging or the handwheel is not at the correct position to allow a color change.
	D06 Tripping Main Motor	Power fluctuations to driver unit.	Start with the Start/Stop bar.
	D07 Main Motor Overload	Main driving motor has been overloaded.	Turn the power off. Check for a bind by turning the handwheel. Check for excessive thread behind the sewing hook.
	D08 Limit of the Frame	The pantograph has reached one of the soft limits.	Reposition the start point of the pattern so that it sews within the soft limits. Or, reset the soft limits for a larger sewing field.
	D09 Stop switch error	The drive stop switch is stuck or defective.	Check to see if the stop switch is stuck on. If error continues, call a service technician.
	D12 Trimmer's Slider	Slider in path of needle or not in proper position.	Return the slider to the proper position.
	D13 Unable to Stitch Back	A color change or the beginning of the pattern reached while automending.	None. Move the Start/Stop bar to the left to begin sewing forward in the pattern.
	D14 Start with Bar Switch	You must use the Start/Stop bar to execute the selected manual operation.	Move the Start/Stop bar to the left to execute the command.

	DISPLAYED	MEANING	ACTION REQUIRED
	D15 Top Thread Break	Indicates a top thread break.	Re-thread the needle, then move the Start/Stop bar to the left to resume sewing.
	D16 Bobbin Thread Break	On machines equipped with the UTSM sensor, indicates a bobbin thread break or that the bobbin has run out of thread.	Replace the bobbin, then move the Start/Stop bar to the left to resume sewing.
	D17 Stopped by Teaching	Displayed when using Teach to insert new function codes.	None
	D19 Stopped by Stop Mark	Displayed at function codes when teaching with the sewing method.	None
	D20 End of Automending	The machine has finished automending, reaching the stitch where backup began.	Move the Start/Stop bar to the left to continue sewing the pattern.
	D21 Stopped by Bar Switch	Sewing has been stopped with the Start/Stop bar.	Move the Start/Stop bar to the left to continue sewing the pattern.
	D22 Trim Motor Error	Bobbin trimming error.	Check for obstructions in the bobbin trimmer knives' path. If error continues, power down automat and driver unit, wait 5-10 seconds before turning on again.
	D23 Stopped by APPLIQUE (Stop mark)	Machine has stopped and is ready to attach an appliqué.	Attach the appliqué and move the Start/Stop bar to the left to continue sewing the pattern.
	D25 Thread Break	Indicates a thread break.	Check bobbin or re-thread needle, then move the Start/Stop bar to the left to continue sewing.

DISPLAYED	MEANING	ACTION REQUIRED	
	<p>D26 Is fan moving?</p>	<p>The pantograph drive motor is overheating or in an overcurrent condition.</p>	<p>Turn power off and let machine cool down. Make sure fan and driver unit work properly. Check that nothing blocks fan ventilation. If error occurs again, contact a service technician.</p>
	<p>D27 Temporary Repair Stop</p>	<p>Sewing has been stopped because the machine encountered a temporary repair stop signal that was inserted in the previous run of this design.</p>	<p>Turn on the head that was turned off in the previous run, then move the start/stop bar to the left to continue sewing. See the <i>Operation Guide</i> for information on temporary repair stops.</p>
	<p>D28 Cannot Backup past Color Change</p>	<p>The machine cannot continue backing up past the color change, unless you execute a manual trim.</p>	<p>Execute a manual trim. Then continue backing up to the required point.</p>
	<p>D29 Seek Origin</p>	<p>Displays when you turn on the machine.</p>	<p>Press the Execute icon to let the machine seek origin.</p>
	<p>D30 Head Control Board Error</p>	<p>An error has occurred with the Head Control board.</p>	<p>Contact a service technician.</p>
	<p>D31 Driver Error</p>	<p>Communication error between the automat and driver unit.</p>	<p>Check that the 25-pin cable between the automat and driver unit is seated properly on both ends. If error reoccurs, contact a service technician.</p>
	<p>D32 Sub End</p>	<p>There is an SE function code in the design.</p>	<p>To use the manual Roll to Roll feature, release the fabric clamps then move the start/stop bar to the left. The needle stays down in the fabric while the pantograph moves back to the design's origin point. After replacing the fabric clamps you can continue sewing, creating a long panel of embroidery.</p>

DISPLAYED	MEANING	ACTION REQUIRED
	D33 Power Interrupt Error	The machine power has been temporarily interrupted.
	D34 Light Curtain Error	Remove the obstruction from the Light Curtain before starting the machine. If machine does not start, check Light Curtain alignment.

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